Department of Agriculture
New South Wales.

N.S.W. DEPARTMENT OF AGRICULTURE

BIOLOGICAL BRANCH—DIVISION OF SCIENCE SERVICES

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# PLANT DISEASE SURVEY

FOR THE

TWELVE MONTHS ENDING 30th JUNE, 1959

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*Twenty-Ninth Annual Report*

Notes compiled by officers of the Plant Pathological Section of the Biological Branch, New South Wales Department of Agriculture, Sydney, Australia

CSIRO
PLANT
COMMONWEALTH MYCOLOGICAL INSTITUTE
MAR 1960

N.S.W. DEPARTMENT OF AGRICULTURE

BIOLOGICAL BRANCH - DIVISION OF SCIENCE SERVICES

# P L A N T  D I S E A S E  S U R V E Y

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TWENTY-NINTH ANNUAL REPORT.

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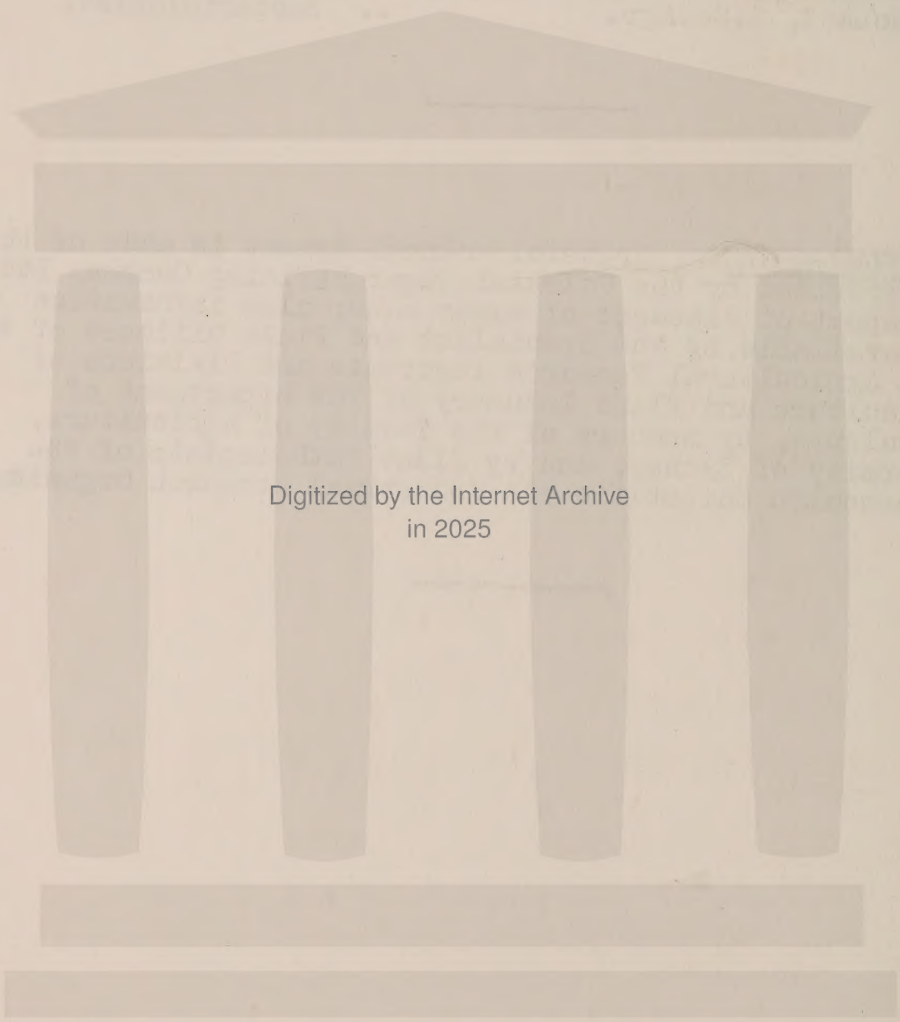

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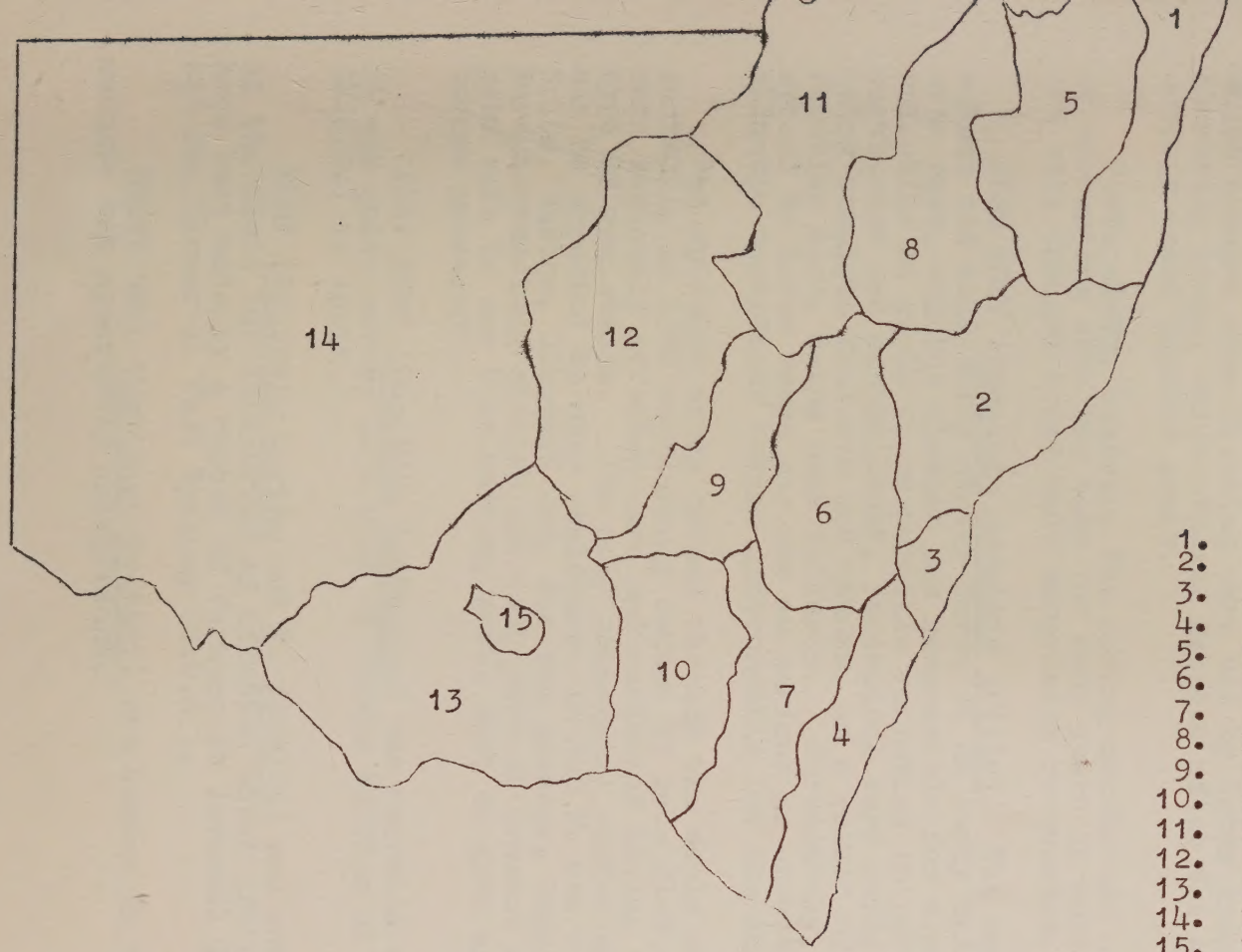

1. North Coast (N.C.)
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9. Central Western Slope (C.W.S.)
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11. North Western Plain (N.W.P.)
12. Central Western Plain (C.W.P.)
13. Riverina (R.)
14. Western Division (W.D.)
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DISTRICTS OF NEW SOUTH WALES.

## CEREALS.

### WHEAT

The 1958-59 season has been one of recovery from the drought conditions experienced in 1957. The season showed remarkable promise but severe frost damage, stem rust in epidemic proportions in some northern and central districts, and premature ripening of some southern crops prevented the attaining of a record yield. Nevertheless it has been estimated that the total harvest was approximately 66,000,000 bushels from 3,100,000 acres sown for grain - an average yield of 21.3 bushels per acre. This contrasts with an estimated total harvest of 10,000,000 bushels the previous season.

FROST INJURY was unusually severe throughout the wheat belt, the worst damage occurring in low-lying situations and on the plains. As a result of very mild conditions in autumn and early winter crops were in a very soft and forward state. Although all forms of injury occurred by far the greatest damage was caused by stem frosting as a result of severe frosts in July and August, and worst damage occurring in early-sown crops of early varieties in low-lying situations. In many cases the original growth was so badly damaged that the harvest was mainly from subsequent regrowth. Many crops which escaped stem-frosting were hit by later frosts in the flowering stage, while others, frosted after the grain had set, produced pinched grain.

Fortunately, however, the spring months and conditions at harvesting were the best for many years in most districts and many damaged crops made surprising recoveries.

STEM RUST (Puccinia graminis tritici). The warm moist autumn and mild early winter favoured an early build-up of stem rust, and the disease was responsible for a marked reduction in yield in susceptible varieties in parts of north-west and central-west, occasional very early crops being complete failures and others, as a result of stem-frosting also, being near failures. Fortunately, however, spread to later crops was not as serious as expected as climatic conditions became unfavourable for the disease.

The epidemic which spread through the whole of eastern Australia in 1958 was largely caused by race 21-2. This race seriously affected Gabo and varieties having the Gabo type of resistance. The only commercial varieties which can be expected to show resistance in N.S.W. are Festival, Spica, Warigo, Glenwari and, for the present, Eureka. Eureka-attacking strains are very rare at present and it would seem safe to sow this variety until such strains again become prevalent.

LEAF RUST (Puccinia triticina) was recorded as usual. It was quite severe on a crop of Winter Minflor at Quirindi (N.S.W.) in April.

BUNT (Tilletia caries and T. foetida) was not observed in the field but deliveries of affected wheat are known to have been made by a number of farmers at Inverell (N.S.W.) and one farmer at West Wyalong (S.W.S.).

LOOSE SMUT (Ustilago tritici) was common in trace amounts but apparently unimportant.

FLAG SMUT (Urocystis tritici) was found in many crops of Gabo in the north-west, affecting many plants in some crops.

FOOT ROT (Helminthosporium sativum and various fungi) was quite common, usually in association with frost injury, however, with the result that the amount of damage directly attributable to it could not be assessed.

TAKE-ALL (Ophiobolus graminis) was observed in the south-west, often in conjunction with frost injury and premature haying-off, with the result, again, that no reliable estimate of its importance could be made.

EYESPOT (Cercosporella herpotrichoides) was recorded at Berrigan (R.).

GLUME BLOTCH (Septoria nodorum) was recorded on the nodes of frosted plants at Berrigan (R.)

POWDERY MILDEW (Erysiphe graminis) was much more conspicuous than usual on the slopes and plains, no doubt being favoured by the mild, moist conditions. It was, however, confined to the lower parts of the plants and did not appear to be of importance.

NON-PARASITIC MELANISM was quite common on the upper part of the stem, just below the ear, late in the season. It is thought that this apparently harmless condition develops under the influence of warm, humid weather.

MOTTLING and SCORCHING (undet.) was observed in April, May and June in several crops of Winglen in the north-west.

HAIL INJURY was estimated to have been responsible for a loss of 1,300,000 bushels or approximately 2% of the harvest. However, it is possible that some frost injury has been included in this estimate.

VIRUS DISEASES. A sap-transmissable streak-mosaic was found by members of the Faculty of Agriculture, University of Sydney, in a few plants of a new cross sown out of season in February at Carroll (N.S.W.) This is the third virus disease of wheat to be detected in N.S.W. since 1956. Cereal yellow dwarf was detected at Tamworth (N.S.W.) that year and subsequently another virus disease was found by the Agricultural Research Institute, Wagga. None of these diseases has yet been found to be of importance here.

OATS

STEM RUST (Puccinia graminis avenae) was recorded from several areas, but no reports of severe infections were received other than one on a self-sown crop of Bourke at Wattamondara (S.W.S.) in April. This outbreak was undoubtedly favoured by the warm moist autumn.

LEAF RUST (Puccinia coronata) was unusually severe in many districts, particularly the coast and tablelands, during the autumn, again being favoured by the mild, damp conditions.

LEAF SPOT (Helminthosporium avenae) occurred widely but did not appear to be of any importance.

FROST INJURY, although much less damaging than it was in wheat, was much more prevalent than usual. Leaf frosting was common and severe throughout the western slopes. A crop of Lampton near Orange (C.T.) was severely head-frosted at the beginning of November, and a crop of Dale at Gilgandra (C.W.S.) was severely stem-frosted in August.

HEAT CANKER was reported in an early sown crop at Werris Creek (N.W.S.). Many seedlings showed a whitish lesion at ground level and subsequently collapsed. Others showed a white-banding of the leaves which suggested that the injury occurred on successive days. The crop concerned subsequently made a considerable recovery.

BARLEY

COVERED SMUT (Ustilago hordei) was common throughout the north-west but rarely present in sufficient quantity to cause a noticeable reduction in yield.

LOOSE SMUT (Ustilago nuda), on the other hand, was rare.

SCALD (Rhyncosporium secalis) was observed to be severe on a crop at Cowra (C.W.S.) in September.

RYE

STEM RUST (Puccinia graminis tritici) was observed in the north-west during the spring but was unimportant.

LEAF RUST (Puccinia dispersa) was recorded from Wamberal (C.C.).

MAIZE

HEAD SMUT (Sphacelotheca reiliana) was recorded from all parts of the coast and appears to have been unusually prevalent. The warm, dry spring is thought to have provided soil conditions favourable for infection. Various hybrids and inbreds were affected and field observations suggest that Victory may be particularly susceptible. This susceptibility is reported to be the reason for this hybrid's losing favour in the Macleay River district (C.C.).

RUST (Puccinia sorghi) was again very common in the later part of the season, no doubt being favoured by the warm, moist conditions. Nearly all specimens examined were carrying the hyperparasite Darluca filum, which caused considerable suppression of spore production.

LEAF BLIGHT (Helminthosporium turcicum) was very severe in late summer and autumn during the warm, wet weather. Both sweet corn and maize were affected. All early maturing hybrids such as Emblem, Dawn, and the D.S. Hybrids are susceptible. G.H.128 possesses some resistance but is not favoured in the cooler districts as it is late-maturing.

DAMPING-OFF (Fusarium spp.) was troublesome in certain inbreds at the New England Experiment Farm, Glen Innes (N.T.), during November.

COB ROT (Diplodia zeae) caused a 25% loss in 5 acres of G.H.128 at Rappville (N.C.). This disease is much less common in N.S.W. than in Queensland.

BLACK COB ROT (Helminthosporium carbonum) was recorded for the first time in N.S.W. in a seed increase area of 25 x 23 (F$_1$) near Taree (C.C.). In the United States this

disease is reported to be rare, resistance being dominant, with the result that unless two susceptible inbreds are used to produce a hybrid it is not susceptible. It is hoped that the position will prove to be the same here.

STALK AND COB ROT (Fusarium spp.) seem to have been less troublesome than usual in spite of the wet weather in late summer. These diseases were reported to be prevalent on the New England Experiment Farm, Glen Innes (N.T.), however.

SCALDING, STUNTING and CHLOROSIS was reported at Murwillumbah (N.C.) and it seems probable that molybdenum deficiency was responsible.

BARREN STALKS were a cause for concern in a crop of G.M.211 at Oxley Island (C.C.) and similar, though less serious, occurrences were reported from other areas. A chemical analysis showed that nitrogen was very low and this may well have been responsible.

WALLABY EAR (suspected virus). No reports of this disease were received this year.

SORGHUM

SPIKELET BLIGHT (undet.) was again prevalent in the north-west and in occasional instances elsewhere. This condition is quite distinct from sorghum midge injury and the cause is not yet clear. However, an analysis carried out by the Chief Chemist has shown that in affected plants nitrogen was very low and other nutrients at sub-optimal levels.

ROOT and CROWN ROT (Fusarium spp.) was observed in several crops in north-western areas, both Caproc and Redbine 66 being affected. Considerable lodging and premature haying-off occurred in a crop at Loomerah (N.W.S.) and a 10% loss was reported in a crop at Moree. In some cases the fungus Macrophomina phaseoli was also present.

LEAF BLIGHT (Helminthosporium turcicum) was present in many coastal crops during the hot, wet weather in late summer.

STUNTING and PROLIFERATION was observed to be affecting less than 1% of the plants in a crop of Caprock at Wakool (R.). The cause of this condition is unknown but it has occasionally been observed in previous years in irrigated crops.

RED STAIN (undet.) was prevalent as usual but apparently is of little or no importance.

HEAD MOULD (Alternaria tenuis and Cladosporium herbarum) was common in many crops following aphid and green vegetable bug infestations.

BROOM MILLET

HEAD SMUT (Sphacelotheca sorghi) was recorded from Kyogle (N.C.).

RICE

No records.

SUGAR CANE:

(Information was kindly supplied by the Colonial Sugar Refining Co. Ltd.)

During the 1958 crushing season in N.S.W., 471,658 tons of cane were crushed and it is estimated that 420 tons were lost as a result of diseases.

RED ROT (Physalospora tucumanensis (Glomerella tucumanensis)) was much less serious than in the previous season, losses having fallen from 11,140 tons in 1957 to 260 tons in 1958.

CHLOROTIC STREAK (virus) was responsible for an estimated loss of 100 tons.

LEAF SCALD (Xanthomonas albilineans) caused a loss estimated at 50 tons.

FIJI DISEASE (virus) again only caused a loss estimated to be 10 tons. This disease was also observed in a crop of Pindar grown for fodder at Kempsey (C.C.).

RATOON STUNTING (virus) was observed but no estimate of the loss made.

## MISCELLANEOUS GRASSES

BENT GRASS (Agrostis tenuis)

BROWN PATCH (Rhizoctonia solani) was prevalent as usual.

DOLLAR SPOT (Sclerotinia homoeocarpa) was observed on sports turf in the metropolitan area.

LEAF BLIGHT and MELTING OUT (Helminthosporium sp. and Curvularia sp.) was observed in the metropolitan area during the summer and again proved difficult to control.

SEEDLING BLIGHT and FADING OUT (undetermined) were again common in seedling stands in the autumn. Last season most plants so affected were found to have abundant oospores of Cladochytrium sp. in their roots, but this autumn these were rarely found.

BLUE COUCH (Digitaria didactyla)

BROWN PATCH (Curvularia sp.) was very severe on several lawns in the metropolitan area.

COCKSFOOT (Dactylis glomerata)

ERGOT (Claviceps purpurea) was observed in an observational nursery at Temora Experiment Farm (S.W.S.).

COLUMBUS GRASS (Sorghum almum)

RUST (Puccinia purpurea) was very severe at Grafton Experiment Farm (N.C.), the sori being heavy parasitised by Darluca filum as is usual with this rust in N.S.W.

LEAF BLIGHT (Helminthosporium turcicum) was recorded for the first time in N.S.W., also at Grafton Experiment Farm (N.C.).

STERILITY (undetermined) was common in north-western areas. An analysis by the Chief Chemist of affected specimens from Graman (N.W.S.) showed them to be very low in nitrogen.

COUCH (Cynodon dactylon)

BROWN PATCH (Rhizoctonia solani) was reported from the metropolitan area and other parts of the coast, being prevalent as usual during the humid weather in summer.

DOLLAR SPOT (Sclerotinia homoeocarpa). There were no authenticated records of dollar spot on couch this season.

LEAF BLIGHT and DYING OUT (Helminthosporium cynodontis) was severe during the warm, wet summer, and again proved very difficult to control on lawns and sports turf in the metropolitan area, on the north coast, and on the central tablelands.

SMUT (Ustilago cynodontis) was widespread as usual. An unusually severe onbreak, however, was recorded from the greens of the Erskineville - Alexandria Bowling Club (M.A.). In this case the infected plants were yellow and stunted, a symptom which has not previously been observed.

SLIME MOULDS (Physarum spp and Fuligo septica) were common on lawns in coastal districts during the summer.

HUNGARIAN MILLET (Setaria italica)

LEAF BLIGHT (Piricularia grisea) was severe on a crop at Moree (N.W.P.) during an unusually wet period in summer.

KIKUYU (Pennisetum clandestinum)

DYING OUT (undetermined) in patches which gradually increased in size was again common on the north coast, and as yet, investigations have still not revealed the cause. A similar condition was also recorded from Broken Hill (W.D.), but in this case an unidentified fungus has been found associated with the dying runners and shown to be pathogenic. It is not known, however, whether it is the primary cause of the condition.

LEAF SPOT (Helminthosporium mediocre) was severe in the autumn in the metropolitan area and also at Milton (S.C.) in a small area used for grazing.

PASPALIDIUM AVERSUM

ERGOT (Claviceps sp.) was prevalent in a stand of this native grass on river country at Gunnedah (N.W.S.) The sclerotia were rounded and cream to pale brown and have not yet been germinated.

PHALARIS (Phalaris tuberosa)

ERGOT (Claviceps phalaridis) was noted in seed samples harvested from many areas in the south-west. Many samples, as a result of this, contained more than the 1.5% of inert matter which is allowed and have had to be re-cleaned.

PIGEON GRASS (Setaria sp.)

RUST (Puccinia sp.) was recorded at Baulkham Hills (M.A.)

PLAINS GRASS (Stipa aristiglumis)

SMUT (Ustilago hypodytes) was observed at Graman (N.W.S.).

RYE GRASSES (Lolium spp.)

No records.

STINK GRASS (Eragrostis cilianensis)

DOWNY MILDEW (Sclerophthora sp.) was reported from Gunnedah (N.W.S.). Infected plants typically produced tufts of distorted and twisted leaves from their bases, as well as a few apparently normal shoots and inflorescences.

SUMMER GRASS (Digitaria sp.)

SMUT (Ustilago syntherismae) was recorded at Baulkham Hills (M.A.)

VIRESCENCE (undetermined) was recorded for the first time in N.S.W., also at Baulkham Hills (M.A.).

TIMOTHY (Phleum pratense)

VIRESCENCE (undetermined) was recorded from Bathurst (C.T.).

## FIELD AND FODDER CROPS

### CLOVER, BERSEEM (Trifolium alexandrinum)

STEM ROT (Sclerotinia sp.) was recorded damaging a stand at Seven Hills (M.A.)

VIRESCENCE (undetermined.) was reported from the Bathurst District (C.T.)

### CLOVER, CRIMSON (Trifolium incarnatum)

SOOTY BLOTCH (Polythrincium trifolii), which was recorded for the first time on this host in N.S.W. last year at Comboyne (C.C.), was recorded from Berry (S.C.), Eastern Creek (C.)., and Palmdale (C.C.).

### CLOVER, RED (Trifolium pratense)

CROWN ROT (Sclerotinia sp.) was recorded from Eastern Creek (C.C.).

RUST (Uromyces trifolii) was also recorded from Eastern Creek (C.C.).

SOOTY BLOTCH (Polythrincium trifolii) was recorded from Gloucester and Eastern Creek (C.C.).

ROOT ROT (Meloidogyne sp.) was found to be severe in two stands in the Taree (C.C.) district and is thought to be responsible for the death of many plants.

RUGOSITY (virus?) was observed at Wingham (C.C.). The condition appeared similar to rugose leaf curl but may only have been the result of insect feeding.

FROST INJURY was severe in a stand at Glouvester (C.C.) in July.

### CLOVER, SUBTERRANEAN (Trifolium subterraneum)

RUST (Uromyces trifolii subterranei) occurred as usual and a severe infection was noted on Clare, Yarloop, and Bacchus Marsh at Bunyah (C.C.).

LEAF SPOT (Cercospora sp.) was recorded on Bacchus Marsh at Ballengarra (C.C.) and on Dwalganup and Bacchus Marsh at Taree (C.C.). The disease was quite severe in patches in the affected pastures.

POWDERY MILDEW (Oidium sp.) was recorded in one pasture at Taree (C.C.) on Dwalganup. Its occurrence was patchy.

BURN (Pseudoplea trifolii) was quite severe in a stand of Yarloop at Taree (C.C.). In this case there was considerably more scorching than is usual for this disease.

BLACK STEM AND LEAF SPOT (Phoma sp.) was observed to be quite severe in a stand of Dwalganup at Gooloogong (C.W.S.). This disease was present in a trace amount only on Mt. Barker in the same locality.

STEM GALL (Physoderma trifolii) was reported from Berrigan (R.).

STUNT (virus) was reported on several varieties at Bathurst (C.T.)

MOSAIC (virus) was observed occurring in patches 6 - 8 feet in diameter in a stand at Branxton (C.C.). A patch was also observed in an otherwise healthy paddock at Oxley Island (C.C.).

FROST INJURY was severe in all parts of the state. This was no doubt the result of a prolonged mild autumn followed by sudden severe frosts. Clare seems to be more susceptible than other varieties.

STUNTING (undetermined), associated with black wart-like outgrowths on the tap roots, was recorded in a stand of Bacchus Marsh at Berrigan (R.) No reason could be found for this curious condition.

CLOVER, WHITE (Trifolium repens)

LEAF SPOT (Cercospora sp.) was recorded from Nundle (C.C.).

BURN (Pseudoplea trifolii), though usually of negligible importance, was quite severe on two stands of Ladino in the Taree district.

ROOT KNOT (Meloidogyne sp.) appeared to be a limiting factor in a stand in the Taree (C.C.) district.

RUGOSITY (virus?) was observed in a stand at Wingham (C.C.). The symptoms resembled those of rugose leaf curl but may merely have been caused by insect feeding.

VIRESCENCE (undetermined) was prevalent in experimental plots in the Bathurst (C.T.) district.

COTTON (Gossypium hirsutum)

BACTERIAL BLIGHT (Xanthomonas malvacearum) was prevalent in the experimental area on Narrabri Experiment Farm (N.W.P.) and was also recorded from Maitland. The angular leaf spot, black arm, and boll rot phases of the disease were all present, and the unusually moist summer was no doubt responsible for the severity of the infection.

WILT (Verticillium dahliae) was recorded for the first time in N.S.W. from Narrabri Experiment Farm (N.W.P.) In other parts of the world this disease is associated with alkaline soils and it is therefore interesting to note that it has turned up on an alkaline soil here.

COWPEA (Vigna sinensis)

STEM ROT (Phytophthora vignae) was once more severe on several stands of Poona on the north coast. As has been found previously, however, some farmers have confused this disease with bean fly injury and stem canker caused by Rhizoctonia solani.

STEM CANKER (Rhizoctonia solani) was very severe in a crop of Poona at Taree (C.C.). The cause of a crown rot in another crop at Taree was not determined and it may be that Phytophthora vignae was responsible.

ROOT KNOT (Meloidogyne sp.) was observed in a crop of Poona at Gum Flat (N.W.S.).

LINSEED (Linum usitatissimum)

FROST INJURY occurred widely in the north-west at the same time as wheat was badly injured. Linseed, however, stood up to the frosts very well and the amount of damage was almost negligible. As is usual with this plant, only the oldest leaves were affected.

LUCERNE (Medicago sativa)

DOWNY MILDEW (Peronospora trifoliorum) was quite severe in the late autumn and early spring in many stands on the coast and tablelands. Some seedling stands were severely checked but otherwise the damage was transitory.

ANTHRACNOSE (Colletotrichum trifolii), which was recorded in N.S.W. at Appin (S.C.) last year for the first time since 1915, was recorded this year from several localities during the wet period in late summer. The most serious outbreak was at Pallamallawa (N.W.P.) where a whole stand died back. Most crowns, however, were uninjured and it was expected that there would be considerable recovery.

RUST (Uromyces striatus) was widespread but unimportant.

LEAF SPOT (Pseudopeziza medicaginis) was, as usual, the most commonly observed disease. It was damaging, however, in only a few stands on the coast.

ROOT ROT (Phytophthora sp. or Fusarium spp. associated) was recorded at Coonabarabran (N.W.P.), Parkes and Forbes (C.W.S.), and Nerriga (S.C.), causing considerable thinning of the stands in all cases. The disease was associated with waterlogging in late summer.

STEM CANKER (Rhizoctonia solani) caused considerable damage in an 18-month-old stand at Moree (N.W.P.) in February.

VIOLET ROOT-ROT (Helicobasidium purpureum) was observed in a 3 acre paddock at Kyogle. Although only a small percentage of the plants were infected the disease occurred in patches which were enlarging.

DAMPING-OFF (Pythium sp.) was recorded in a crop sown with wheat at Wallendbeen (S.W.S.)

WITCHES' BROOM (virus) was prevalent as usual in western districts.

FROST INJURY was recorded in July and August from Ghinni Ghi and Grafton (N.C.), Inverell (N.W.S.), and Camden (M.).

MEDIC (Medicago glutinosa)

RUST (Uromyces striatus) was recorded at Grafton Experiment Farm (N.C.) for the first time in N.S.W. on this host.

MEDIC, BURR (Medicago denticulata)

RUST (Uromyces striatus) was recorded at Baulkham Hills (M.A.).

LEAF SPOT (Pseudopeziza medicaginis) was severe on this host in June at Baulkham Hills (M.A.). It is interesting to note that plants of Medicago arabica growing amongst the infected plants of M. denticulata were unaffected.

MEDIC, SPOTTED (Medicago arabica)

ANTHRACNOSE (Colletotrichum trifolii) was recorded for the first time in N.S.W. on this host at Grafton Experiment Farm (N.C.).

RUST (Uromyces striatus) was recorded at Baulkham Hills (M.A.).

PEANUT (Arachis hypogoa)

MOULDY KERNELS (Cephalothecium, Aspergillus and other fungi), were very common in a crop harvested at Kyogle (N.C.). The crop was harvested during wet weather and no doubt stored damp.

SOYBEAN (Soja max)

BACTERIAL BLIGHT (Pseudomonas sp.) was recorded from Gunnedah (N.W.S.). There was a moderate amount of dark, angular leaf-spotting.

ROOT ROT (Fusarium sp.?) affected isolated plants scattered through the same crop at Gunnedah (N.W.S.).

TOBACCO (Nicotiana tabacum)

BLUE MOULD (Peronospora tabacina) was once more the most serious disease of tobacco in N.S.W. It is estimated that this disease was directly responsible for the loss of one third of the total crop and, indirectly, of a further 10%, since many of the crops, when cut back by hail, failed to sucker because of blue-mould infection.

In the seedbeds the disease was not troublesome, owing to the effectiveness of the benzol treatment, but in the field no control measures were satisfactory. However, one grower applied Zebtox (20lb/acre) to his crop three times a week and, apparently as a result of this and restricted irrigation, his losses were significantly reduced.

Resistant lines bred by this department show considerable promise in the field and it is hoped that a resistant variety suitable for commercial production will be produced in the near future.

BLACK STEM-ROT (Pythium aphanidermatum)was observed in the Bonshaw and Ashford districts (N.W.S.). P. aphanidermatum usually only causes damping-off in the seedbeds but the wet weather in January and February favoured an outbreak in the field. Losses, however, were not serious and no attempts to control the disease were made.

ROOT KNOT (Meloidogyne sp.) was not obviously troublesome owing to the widespread use of E.D.B. as a soil fumigant but late infestations may have been responsible for some of the trashy leaf produced.

DAMPING-OFF (undetermined) occurred as usual. Sterilization of seedbeds with methyl bromide (9 lb/100 sq. yds.) reduces losses and weekly applications of copper oxychloride also help.

HAIL DAMAGE was serious in many crops and, in combination with blue mould, was responsible for considerable losses. Lightning damage also occurred.

TOBACCO MOSAIC and other virus diseases, LEAF SPOT (*Ascochyta* sp.), BARN ROT (*Rhizopus arrhizus*) and secondary bacterial soft-rots were also reported.

VETCH (*Vicia sativa*)

ANTHRACNOSE (*Colletotrichum* sp.) was recorded at Grafton (N.C.) in September. Affected plants showed stem cankers and many of them yellowed and died.

FROST INJURY was recorded at Grafton (N.C.) in July.

## CANE FRUIT

ANTHRACNOSE (*Elsinoe veneta*). Severe infection of youngberry occurred at Molong (C.W.S.) in late November. Rather light infection of loganberry was reported from metropolitan home gardens during late autumn.

# CITRUS FRUITS

Climatic conditions in all districts were reasonably favourable for tree growth throughout the year, and good to very heavy crops of fruit were produced.

## DISEASES CAUSED BY PARASITIC FUNGI.

### PHYTOPHTHORA ROOT, COLLAR & FRUIT ROT.

(Phytophthora citrophthora). No important new manifestations of these diseases were recorded. Trees on rough lemon stock which have continued at a low level of vigour since they were affected in 1949 - 52 and 1956 bore better crops this year in orchards in some parts of the Gosford district (C.C.) and at Narromine (C.W.S.) and the M.I.A. It is not yet certain that this improvement is of a permanent nature. Mature seedling Emperor mandarin trees in some Paterson orchards (C.C.) which were affected with root rot in 1956 have shown a considerable improvement, indicating a greater degree of resistance to Phytophthora than rough lemon stock.

A low percentage of yearling citrus trees (mostly lemon) were infected with collar rot during winter 1958 in one metropolitan nursery.

BLACK SPOT (Guignardia citricarpa). Rather severe infection of main crop Valencia oranges was reported during November and December in the Hills District (M.A.) and Gosford districts (C.C.) and at Penrith (M.A.) Moderate to severe spotting of intermediate crop Eureka lemons and second crop Valencias occurred during the summer in some Hills district (M.A.) orchards.

Leaf spotting of minor importance was seen in Emperor mandarins and rough lemon at Paterson (C.C.)

Inability to spray, or the omission of white oil from the fungicide used, was associated with the more serious outbreaks of black spot.

MELANOSE (Diaporthe citri). Spring and early summer weather was unfavourable to melanose development, but moderate infection of fruit and foliage occurred in coastal orchards following rains in January. Old trees where dead wood has accumulated are most subject to the trouble. Emperor mandarins and Washington navel oranges in Hawkesbury River orchards (M.A.) were particularly affected. Considerable die back of cut back Washington navel orange trees and infection of new growth occurred in a Raymond Terrace orchard (C.C.) A small amount of branch die back due to infection by Diaporthe was observed in orchards at Wiseman's Ferry (M.A.) and Dooralong (C.C.)

Diaporthe was found to be associated with limb canker of young Valencia orange trees in a Hanwood (M.I.A.) orchard. It is thought that infection followed frost injury. Diaporthe was also present in a trunk canker of Eureka lemon at Yanco Experiment Farm (M.I.A.), following an injury. These are only the second and third occasions on which this fungus has been found in inland orchards. A small amount of leaf infection occurred adjacent to the cankers.

SCAB (Sphaceloma fawcettii scabiosa). Maincrop lemons in coastal citrus orchards were very free of disease. Slight infection of intermediate crops occurred in some Hills district (M.A.) and Somersby (C.C.) orchards. Slight scab infection of rough lemon stocks occurred in several metropolitan and Gosford district (C.C.) nurseries. Severe infection of intermediate crop Ellendale mandarin fruit was noted in a Mangrove Mountain (C.C.) orchard in November 1958. Slight foliage infection of Emperor mandarin occurred in several Paterson orchards (C.C.) during autumn, and of Dancy mandarin at Narara (C.C.)

BROWN SPOT (Cause undetermined). Spring infection was negligible, but following rain and periods of high humidity in summer and autumn 1959 slight to moderate infection of fruit of Emperor mandarin occurred in orchards along the Hawkesbury River (M.A.) particularly at Lower Portland. Some foliage infection of young Emperor mandarins also occurred in the autumn in Hawkesbury River orchards and at Wedderburn (S.C.), in the Citrus Experiment Station plantings at Somersby and Narara (C.C.) Moderate to severe foliage and shoot infection of Citrus hystrix occurred in November, and of San Jacinto tangelo and Dancy mandarin seedling stocks in February and of young Calamondin trees in May at the Citrus Experiment Station, Narara. Infection of rough lemon was observed in several orchards in the Hawkesbury River area (M.A.) during autumn 1959 and also at Paterson (C.C.) although no infection occurred in Emperor mandarin in any Paterson orchard, or has ever been seen in this area.

SEPTORIA SPOT (Septoria depressa). Infection appears to have been negligible in M.I.A. and Murray R. orchards during 1959.

SOOTY BLOTCH & FLY SPECK (Glooodes pomigena and Leptothyrium pomi). Light infection was reported from several Hawkesbury R. orchards, (M.A.) of Washington Navel oranges during early winter 1959.

ARMILLARIA ROOT ROT (Armillaria mellea). Continued activity of this disease was reported from Kulnura (C.C.) Maroota (M.A.) Lower Portland (M.A.) and Paterson (C.C.)

SUDDEN DEATH (Suspected Coprinus sp). Was recorded from Pomona (W.D.) affecting Parker mandarin stock, from Pitt Town (M.A.) affecting rough lemon stocks of 40 year old mandarins, following earlier injury by Phytophthora citrophthora, and from Pitt Town (M.A.) and Dooralong (C.C.) affecting trees on Poncirus trifoliata stock.

LEAF SPOT (Corynespora citricola). This disease made its appearance during the winter months, affecting glasshouse grown seedlings of many varieties at the Sydney Botanic Gardens.

RHIZOCTONIA COLLAR ROT (Rhizoctonia solani). Seedlings of Carrizo citrange developed a low percentage of infection at the Lower Murray Research Station, Dareton (W.D.) in spring 1958.

VIRUS DISEASES

SCALY BUTT (Virus). No new records.

SHELL BARK (Suspected virus). Was prevalent as usual in mature Eureka lemons in all sections.

STEM PITTING (virus). Some fruit distortion, thought to be due to this disease was seen in Smooth Seville oranges at Wamberal (C.C.) in spring 1958, and in Ellendale mandarins at Wrights Creek (C.C.) and Penrith (M.A.). Infection of Marsh grapefruit continues in several orchards at Coomealla and Goodnight (W.D.) and at Raymond Terrace (C.C.) and Narromine (C.W.S.)

FLORIDA GUMMOSIS (Suspected virus). This disease was observed in yearling trees of Calamondin on trifoliata stock in a metropolitan nursery during July, 1958. Almost all of several hundred trees showed slight to moderately severe blistering. Severe blistering was also seen in single trees of Marsh grapefruit at Narromine (C.W.S.) and at Yanco (M.I.A.) A sudden and very severe outbreak occurred during mid-summer in 40 year old Washington Navel orange trees in a Wilberforce orchard (M.A.). Trees of Australian Navel scattered through the block were not affected nor were adjacent trees of Valencia orange. The affected trees had suffered severely from drought in 1957-8, had been cut back and had received a heavy dressing of nitrogen in the spring. Previous observations on Florida Gummosis indicate that onset of blistering follows a condition of stress brought on by drought, heat, heavy fertilizer applications, etc.

XYLOPOROSIS (Virus). Symptoms of this disease were seen in about 50 four year old Ellendale mandarins on trifoliata stock at Narromine (C.W.S.), in one Ellendale on rough lemon stock about 30 years old in a metropolitan home garden, in two trees of Harvard blood orange on trifoliata stock at Yanco Experiment Farm (M.I.A.), in two trees of Sampson tangelo at the Citrus Experiment Station Narara and in a number of trees of Golden Nugget orange on rough lemon stock at Curlwaa (W.D.) and Narara (C.C.)

WOODY GALL (Virus). Infection of home garden trees of seedling rough lemon was recorded from Coogee, Gordon and St. Leonards (M.A.). Rough lemon stocks of 30 year old Washington Navel, Valencia and Siletta oranges in a Penrith orchard (M.A.) were found to be affected. This disease was recorded for the first time on single trees of Eureka lemon at Kenthurst (M.A.) and Springfield (C.C.) and on several seedling sour orange trees at Narara. (C.C.)

TRISTEZA (Virus). Two year old rough lemon stocks were used for budding with a number of citrus varieties in a series of experiments at the Citrus Experiment Station, Narara (C.C.) in autumn 1959. In spring 1958 the growth of many of the varieties was extremely poor and yellows symptoms were apparent. The presence of the tristeza virus in these affected trees was confirmed by indexing to sour orange seedlings. Varieties showing symptoms were shaddock, grapefruit, lemon and sour orange. The tristeza tolerant varieties orange and mandarin were unaffected. It is likely that the rough lemon stocks had become infected prior to budding.

CRINKLE LEAF (Virus). Yearling trees of Eureka lemon in a small metropolitan nursery were found to be affected with this disease.

PSOROSIS (Virus). No new records.

ROUGH LEMON DECLINE (Suspected virus). Further cases of decline of orange trees on rough lemon stock were reported from Penrith (M.A.) and a Raymond Terrace (C.C.) orchard where several 28 year old Washington Navel oranges showed symptoms of recent onset of decline.

CITRUS ROOT NEMATODE (Tylenchus semi-penetrans). Infestations of this nematode have risen sharply over the past season in trees on rough lemon root stock in the Somersby Mangrove Mountain - Kulnura areas (C.C.). Many orchards which were affected some years earlier with Phytophthora root rot now appear to have their root systems invaded by the citrus nematode. It is difficult to assess the importance of this disease, but productivity is probably affected.

YELLOW LEAF (Magnesium deficiency). Was widespread in coastal orchards and was also recorded from Tomingley (C.W.S.) in trees growing in leached sandy soil.

EXANTHEMA (Copper deficiency). Mild symptoms of exanthema were seen in Valencia oranges at Black Hill (C.C.), Orangeville (S.C.) and Ebenezer (M.A.). Fairly severe symptoms were shown by young trees and 40 year old trees of Thompson Navel orange at Tomingley (C.W.S.). This is only the second record of copper deficiency from a western locality.

MOTTLE LEAF (Zinc deficiency). Slight to moderate symptoms were observed in orchards along the Hawkesbury R. (M.A.), at Paterson (C.C.), Black Hill (C.C.), Raymond Terrace (C.C.), Tomingley (C.W.S.), the Murrumbidgee Irrigation Area and the lower Murray R. (W.D.)

ACID SPOT (Excess manganese uptake). Mild symptoms of acid spot were seen in 4 year old Washington Navel oranges on trifoliate stock in two Narromine (C.W.S.) orchards. The soil in the affected areas was found to have a pH value of 4.8. Symptoms were also seen in young Washington Navel oranges on trifoliate stock at Wiseman's Ferry (M.A.). Fairly severe acid spot was reported affecting young orange trees at Berrigan (R.).

YELLOWS (Cause not known). The development of this disorder, which affects young trees which are not carrying a crop and have made very vigorous late summer growth, has been very noticeable in most citrus growing areas during autumn and winter 1959. It was reported from numerous orchards in the Murrumbidgee Irrigation Areas, the lower Murray R. (W.D.), Hawkesbury R. area (M.A.) Medowie (C.C.) Raymond Terrace (C.C.) and Paterson (C.C.)

MANDARIN SCALD. (Suspected lack of balance between N. & K). A favourable growing season and very heavy cropping resulted in the development of slight to very severe scald in several Hawkesbury R. orchards (M.A.). A moderate development of scald was also reported from an orchard at Black Hill (C.C.) This disorder develops in trees of Emperor mandarin which are carrying excessively heavy crops and commences as the fruit is reaching maturity. In severe cases die back follows.

BORON TOXICITY. Citrus in home orchards at Broken Hill (W.D.) showed symptoms of fairly severe boron toxicity.

OTHER DISORDERS

YELLOW RING. (Suspected scion-stock incompatibility). This disorder was observed affecting a four year old Palestine citron on trifoliata stock at the Lower Murray Research station (W.D.), nucellar Eureka lemons on Carrizo citrange at the Citrus Experiment Station, Somersby, (C.C.) and sour orange on trifoliata stock at Somersby and Narara (C.C.)

LEMON WOOD POCKET. (Genetic disorder). Yearling Eureka lemon trees in a small metropolitan nursery were found to be affected with this disorder.

SHOOT BLIGHT (Developmental abnormality). This disorder was reported from many metropolitan nurseries and from the Citrus Experiment Station at Narara (C.C.) and Coomealla (W.D.) Mandarins and orange varieties were most affected, up to 50% of budlings being affected in some cases. Little or no shoot blight was recorded in lemons, grapefruit and sour orange,

HAIL INJURY Very little hail damage was noted during the past year. Slight marking of Emperor mandarins was reported from Paterson (C.C.)

LIGHTNING INJURY Slight damage to trees in a Penrith (M.A.) orchard is attributed to this cause.

FROST DAMAGE Drying out of Valencia orange fruit maturing in summer, 1958 occurred in Murrumbidgee Irrigation Areas orchards following a succession of severe frosts in winter 1958, and a considerable proportion of the crop was affected. Flotation methods were developed to separate dry from unaffected fruit.

STYLAR END ROT (Physiological). This disorder was reported on Tahiti lime from a metropolitan garden in late autumn.

## POME FRUIT

APPLE:

BLACK SPOT (Venturia inaequalis). Infection conditions favoured the fungus in most tableland districts. At Batlow ten major infection periods had occurred by the end of December and, where trees were not adequately protected, or where an autumn eradicant spray had not been applied, infection was severe. However, the degree of control in most orchards was excellent, due largely to improved spray schedules, the spray warning service and, in many cases, the use of an autumn eradicant spray. In the Central and Northern Tablelands the disease caused no commercial losses despite favourable infection conditions. This is due to the low level of inoculum following the extremely dry winter of 1957. However, at Orange (C.T.), by the end of the season, the inoculum had again built up to a dangerous level in many orchards.

Heavy infection occurred in home gardens and inadequately sprayed small orchards in the Sydney Metropolitan Area and at Camden (S.C.).

POWDERY MILDEW (Podosphaera leucotricha). Infection was again severe in many districts this season, especially on Jonathan, Rome Beauty and Gravenstein. On the Northern Tablelands the disease was widespread and severe, due largely to the preference of growers for organic fungicides for black spot control. At Orange (C.T.) and Young (S.W.S.) mildew was also prevalent and this could probably be related to the greatly reduced spraying for black spot control. Growers are slow to realise that, under these conditions, powdery mildew control requires special attention.

In contrast to previous seasons, infection on susceptible varieties in the Metropolitan Area was slight. This seems to have been due, in part at least, to improved control practices, probably stimulated by the excellent control achieved in the experiment carried out by the Department at West Pennant Hills during the 1957-58 season. This experiment aroused a lot of interest and was well publicised.

Powdery mildew was recorded at Leeton (M.I.A.) for the first time in many years. It occurred in a small home orchard only and was of no commercial significance.

LIMB CANKER AND DIEBACK (Botryosphaeria ribis). Losses from this disease complex were much less than in the previous season, due to the better growing conditions and the increasing awareness of growers of the necessity to prevent the soil from drying out during hot weather. Additionally, the water supply on many farms has been improved. Most of the losses which occurred this season resulted from extension of infections established during the previous season.

RIPE ROT (Gloeosporium sp.). This disease continued to increase in distribution and severity in the Sydney Metropolitan Area and in the Camden-Oakdale-Lakesland district (S.C.). In these areas it is now necessary to apply control measures specifically for this disease. The varieties chiefly involved are Willie Sharp and Granny Smith, while at Camden (S.C.) heavy infection also occurred in some orchards on Jonathan and Red McIntosh.

ROOT ROT (Armillaria mellea). Further losses from this disease were recorded this season at Willigobung (S.W.).

MOSAIC (Virus) occurred throughout the State. The disease is present in most Jonathan trees, and symptom expression was pronounced this season. Several reports were received of infected trees showing severe spray injury and weather damage.

GREEN CRINKLE (Virus) was detected at Coonabarabran (N.W.P.), Glen Innes (N.T.) and in further orchards at Orange (C.T.) and on the Northern Tablelands. In practically every case where this disease has been detected the trees were planted about 1940. In plantings of mixed age groups older trees have appeared to be free of the disease. The disease appears to be confined to Granny Smith.

RING SPOT (Virus) has now been detected in two orchards at Batlow (S.W.S.), one at Willigobung (S.W.S.), eight orchards at Orange (C.T.) and in one orchard at Oakdale (S.C.). This disease has been detected only on Granny Smith.

SOOTY BLOTCH (Gloeodes pomigena) was prevalent in the Metropolitan Area, the Camden district (S.C.) and at many centres on the Northern Tablelands. In some instances growers had to dip their fruit prior to marketing., The disease appears to be most prevalent in those orchards where sulphur has been replaced by organic fungicides such as captan, ziram and Karathane.

NUTRITIONAL DISEASES. The occurrence of boron deficiency is becoming more prevalent in many tableland orchards. Zinc deficiency was reported to be widespread at Forbes (C.W.S.) causing growth restriction and crop reduction. It also was evident to varying degree in some orchards throughout the Metropolitan Area, Northern Tablelands, M.I.A., and to a lesser extent in the Central Tablelands. Symptoms indicative of copper deficiency were observed at Oakdale (S.C.). Phosphorus deficiency occurred in some trees on granite soil on the Northern Tablelands.

PHYSIOLOGICAL DISEASES. Bitter pit was again fairly prevalent in Willie Sharp in the Metropolitan Area but the incidence was less than last season. It also occurred on Jonathan at Oakdale (S.C.) and on Delicious in several districts but was confined mainly to large fruit on trees carrying light crops. Water-core was fairly common especially in Delicious in tableland crops. Jonathan spot occurred in Jonathan in some of the hotter areas.

STEM ROT (Sclerotium rolfsii) caused some loss of young orchard trees in the Metropolitan Area and was also active in some nursery layer beds.

FLAT LIMB-MEASLES COMPLEX (? Virus). At Pennant Hills (M.A.) apparently healthy Malus floribunda grafts worked onto an apparently healthy Granny Smith tree in August 1957 grew very strongly during the first season but flowered poorly and made little growth in the second season (1958-59). The M. floribunda wood developed symptoms identical with those of flat limb; severe symptoms of apple measles developed in the bark and the leaves became distorted and flecked with patches of light green.

WOOD ROTS (Polystictus spp. and Schizophyllum commune) continued to invade trees damaged during the 1957 drought by fire, sunscald and canker (Botryosphaeria ribis) in the Camden district (S.C.). These wood rots continued to be

troublesome on old trees in other districts. S. commune appears to be important only in the coastal and near coastal district.

PEAR:

BLACK SPOT (Venturia pyrina). The incidence of black spot on pears was similar to that on apples.

BLAST (Pseudomonas syringae) caused some blossom blighting at Orange (C.T.). Although this caused some growers a little concern no substantial crop loss was recorded.

FLECK (Fabraea maculata) was recorded on derelict pear trees at Young (S.W.S).

VIRUS DISEASES. Stony pit was recorded on one Williams Bon Chretien tree at Walcha (N.T.) and on Packham's Triumph and Beurre Bosc in several additional orchards at Orange (C.T.).

QUINCE:

FLECK (Fabraea maculata). Throughout the State quince trees which received no protective sprays were severely attacked by fleck. Fruit was severely damaged and many trees were defoliated by mid-summer. Such trees produced new foliage which in turn was severely attacked.

BURR KNOT (Undet.) was prevalent as usual.

## STONE FRUITS

ALMOND:

SHOT HOLE (Clasterosporium carpophilum). Infection was severe and of widespread occurrence. At Young (S.W.S.) trees sprayed in early winter with 0.1 per cent phenyl mercuric chloride were almost free of shot hole in contrast to the severe infection which occurred on similar but non-treated trees throughout the district.

RUST (Tranzschelia pruni-spinosae) was prevalent on almond trees in most districts.

FRECKLE (Fusicladium carpophilum). A severe occurrence was recorded in the Metropolitan Area on a paper shell variety. An adjacent hard shelled almond tree was reported to be free of infection.

VIRUS. A mosaic type leaf pattern was reported from Wagga Wagga (S.W.S.).

APRICOT:

BACTERIAL CANKER (Pseudomonas syringae) was again active on the Murrumbidgee Irrigation Areas and in the Tamworth district (N.W.S.).

BROWN ROT (Sclerotinia fructicola). A substantial blossom and twig blight occurred at Yenda (M.I.A.) but there was little or no brown rot at harvest time. At Koraleigh (R.) some brown rot developed on fruit held for some time after harvest in a shed. At Bathurst (C.T.) heavy infection occurred in mature fruit damaged by hail.

SHOT HOLE (Clasterosporium carpophilum). Heavy infection occurred throughout the Hills District (M.A.) and at Young (S.W.S.). Where a winter treatment with 0.1 per cent phenyl mercuric chloride was applied trees were almost free of the disease despite the high level of inoculum and suitable infection conditions.

FRECKLE (Fusicladium carpophilum) was prevalent in coastal and near-coastal orchards.

RUST (Tranzschelia pruni-spinosae). Heavy infection occurred in the Metropolitan Area.

LEAF CURL (Taphrina deformans) was recorded at East Kurrajong (C.T.) and Mudgee (C.T.).

SALT INJURY. Severe salting occurred in some blocks at Griffith (M.I.A.) following heavy rain and local flooding in March.

ROOT ROT (Phytophthora sp.). In some blocks where there was no obvious salting young trees died rapidly following local flooding in March at Griffith (M.I.A.). A species of Phytophthora was isolated from the roots of these trees but its pathogenicity has not yet been established.

CHERRY:

BACTERIAL CANKER (Pseudomonas syringae) caused no serious losses this season.

BROWN ROT (Sclerotinia fructicola). Very little loss was sustained from brown rot. Slight losses occurred in some orchards, however, at Young (S.W.S.) towards the end of the season.

SHOT HOLE (Clasterosporium carpophilum). Leaf infection was common but no fruit loss was reported.

VIRUS DISEASES and VIRUS-LIKE CONDITIONS. The position remained unchanged.

NECTARINE:

BROWN ROT (Sclerotinia fructicola). There was a slight outbreak in the Metropolitan Area in December and on the Central and Southern Tablelands in January. Substantial infection occurred at Young (S.W.S.).

FRECKLE (Fusicladium carpophilum). Light infection occurred in the Metropolitan Area.

ROOT ROT (Phytophthora cinnamomi). Some additional losses continue to occur.

RUST (Tranzschelia pruni-spinosae). Heavy infection occurred on non-sprayed trees.

LEAF CURL (Taphrina deformans). Heavy infection occurred on inadequately sprayed trees.

STUBBY ROOT (Trichodorus sp.) was recorded for the first time at Leeton (M.I.A.) in a block of Goldmine nectarines.

VIRUS DISEASES. Symptoms resembling those of peach rosette mosaic were observed on Goldmine nectarines at Young (S.W.S.).

PEACH:

BROWN ROT (Sclerotinia fructicola). On the Murrumbidgee Irrigation Areas there was a loss of 10% to 15% of fruit of the varieties Golden Queen and Phillips Cling while in Pullar's Cling and Wight the loss was of the order of 2 to 5 per cent. Much of the infection occurred on fruit attacked by the peach tip moth. Heavy losses also occurred at Bathurst (C.T.) and in some orchards at Orange (C.T.) and on the Northern Tablelands. Some losses were also sustained in the Metropolitan Area and at Camden (S.C.). Some infection also occurred at Young (S.W.S.) but the disease was held under control satisfactorily.

ROOT ROT (Phytophthora cinnamomi) again caused some losses, particularly in young trees planted in non-drained soil derived from Wiannamatta shale in the Metropolitan Area. Heavy and rapid mortality occurred at Griffith (M.I.A.) in some blocks of young peaches following local flooding in March Although no pathogen was isolated, the symptoms strongly suggested pathogenic action by a species of Phytophthora.

RUST (Tranzschelia pruni-spinosae). Severe infection occurred on non-protected or inadequately protected trees in coastal and near coastal districts. In some cases considerable autumn blossoming occurred. Where the recommended schedule of zineb sprays was applied control was excellent. Some growers found that the control was so good that, in the

early varieties, leaf fall was delayed beyond the time when they normally wish to prune. Delayed pruning with these varieties tends to delay blossoming the following spring.

LEAF CURL (Taphrina deformans). Heavy infection occurred on non-sprayed or inadequately sprayed trees throughout the State.

FRECKLE (Fusicladium carpophilum). Infection was heavy on non-protected trees but excellent control was obtained from the schedule of sulphur or zineb sprays recommended for control of both freckle and rust.

SHOT HOLE (Clasterosporium carpophilum). Severe infection occurred, particularly in coastal and tableland districts, on non-sprayed trees. No fruit loss was reported from sprayed orchards.

CROWN GALL (Agrobacterium tumefaciens) caused very heavy losses in nurseries in the Metropolitan Area.

WOOD ROTS (Polystictus spp. and Schizophyllum commune) again were responsible for the rapid decline and death of old trees, particularly those which had been mechanically damaged or sunscalded following rust defoliation.

POWDERY MILDEW (Sphaerotheca sp.). Infection on J.H. Hale peaches at Orange was traced to a nearby hedge of Dorothy Perkins rose. This is consistent with all previous occurrences of powdery mildew on peach fruit. As previously, no leaf or shoot infection was detected.

At the Sydney Botanical Gardens a powdery mildew infection occurred on the leaves of several peach trees growing at the Entomological Branch Insectary grounds.

VIRUS DISEASES. Peach mosaic was detected for the first time in N.S.W. in Halford peach trees in their first year at the Bathurst Experiment Farm and on yearling and older trees at Yanco Experiment Farm. The budwood for the Bathurst trees came from Yanco.

SALT INJURY. Severe salting caused the death of young peach trees in some blocks at Griffith following local flooding in March.

DEFICIENCY DISEASES. Severe manganese deficiency was recorded at Glenorie (M.A.).

PLUM:

BROWN ROT (Sclerotinia fructicola). The later varieties were attacked in the Metropolitan Area causing slight losses. Some heavy losses occurred in orchards on the Central and Southern Tablelands.

RUST (Tranzschelia pruni-spinosae). Severe infection occurred at Orange (C.T.) and at Young (S.W.S.) and in some coastal orchards. The disease appeared in some non-sprayed prune blocks at Young in January and increased rapidly thereafter. Excellent control was afforded by the recommended schedule of zineb plus white oil. Where an inadequate schedule was followed trees were defoliated by the end of March.

BACTERIAL SPOT (Xanthomonas pruni). Heavy infection again occurred on Wickson plums at Medowie (C.C.).

SHOT HOLE (Clasterosporium carpophilum). No significant loss from shot hole was reported this season.

BLOSSOM END ROT (Physiological) occurred on Narrabeen plums at Camden (S.C.) and on d'Agen prunes at Young (S.W.S.).

ROOT KNOT (Meloidogyne javanica). Heavy infection occurred on Buck plum (Ph5) stocks at Narara (C.C.) growing in the same beds as Marianna stocks which were free of root knot. This is the first record of this nematode on plum in N.S.W.

PLUM POCKETS (Taphrina pruni). No report of the occurrence of this disease was received this season.

WOOD ROTS (Polystictus spp., Schizophyllum commune and Fomes setulosus) continued to take their toll, particularly of old prune trees at Young (S.W.S.) in orchards where the soil fertility is low and tree growth restricted.

LINE PATTERN (Virus). Symptom expression was quite pronounced this season particularly on Santa Rosa.

## TROPICAL FRUITS

AVOCADO:

RIPE FRUIT ROT (Colletotrichum gloeosporiodes) caused considerable loss of winter maturing fruit at Duranbah and Piggabeen (N.C.).

ROOT ROT (Phytophthora cinnamomi) caused rapid decline of several mature trees and some loss of seedlings at Durnabah (N.C.).

BANANA:

LEAF SPOT (Cercospora musae). Favourable conditions for infection during the summer lead to moderately serious defoliation in most plantations during the late autumn and winter months where control measures were not effected. Leaf loss was further increased in marginal areas by cold injury especially in the Tweed District (N.C.) where unusually cold winter conditions prevailed.

BUNCHY TOP (virus). Records compiled by the Division of Horticulture show that the number of infected plants detected declined from 4,268 in 1956/57 to 2,700 in the current year, whilst the total acreage increased from 27,774 to 29,659 in the same period. Whilst a very low incidence of the disease is being maintained by the present control scheme, the disease is still widely distributed north of the Richmond River, and isolated detections continue to be made in plantations where no previous detections have been made for periods as long as 7 years. Oil applied for Cercospora leaf spot control has had no significant effect on populations of the aphid vector Pentalonia nigionervosa.

ROOT ROT (cause undet.) Numerous lesions in the cortex of cord roots, and where secondary invasion of the stele occurs, death of entire roots have been observed in many plantations, especially where established on the lighter soil type. Slow growth of suckers in replant soils, unthriftiness in established stools, and falling out of bunched plants is widespread and constantly associated with root necrosis.

A strain of the burrowing nematode Radopholus similis which will not infect Citrus spp. has been recovered from cortical lesions on the roots of banana and sugar cane, and from soil surrounding infected plants. Suckers used for planting material have been found to be infected with this nematode. The significance of R. similis and the possible role of fungal isolates in the syndrome are under review as well as the occurrence of the burrowing nematode in soils of different cropping histories.

SPECKLE (cause undet.) caused considerable leaf loss during the late summer and autumn months in all production areas but especially in the Richmond and Brunswick districts (N.C.). The disease caused little concern during the winter months in contrast with the previous year. The possibility of this disease being caused by Sphaerella musae Spegazzini, isolated by the Queensland Department of Agriculture and Stock, and the possible association of red spider (Tetranychus lambi) activity with Speckle, are under investigation. The inclusion of oil miscible copper fungicides or Zineb with oil applied for Cercospora leaf spot, failed to give consistent control of this disease.

LEAF FALL (cause undet.). Collapse of the leaf system during the winter months of plants in land which has formerly grown sugar cane or paspalum sod, has occurred in isolated plantations in the Tweed and Richmond areas (N.C.). Affected plantations are maturing the first or second crop of bunches and in all cases some root rot is evident.

LEAF SPOT (Cordana musae) was widespread in late autumn/winter period, but mild in its effects. In plantations where Corcospora leaf spot had been controlled by oil application, this disease was observed to be causing some older leaves to fall prematurely.

CORKY SCAB (cause undet.) A considerable quantity of fruit was discarded during the winter of 1958, especially in the Coff's Harbour and Macksville Districts (N.C.) because of the development of lenticular cracks and extensive cork on the skin of mature fruit. Affected bunches were thrown during an unusually dry summer/autumn period and the possibility of this condition being induced by dry soil conditions or a nutrient deficiency, are being investigated.

NUTRITIONAL DEFICIENCY. In an Anderson type trial laid down in an unthrifty plantation at Cudgera (N.C.) a marked response to zinc was noted. Plants which have subsequently responded to soil applications of zinc sulphate are stunted with an erect habit, small, pointed, chlorotic leaves with leaf bases and mid ribs showing marked reddish discolouration. Plants similar to those which have responded to zinc under experimental conditions have been observed in isolated plantations in the Tweed district.

OIL BURN was observed on isolated leaves and maturing bunches which had received excessive oil during leaf spot control operations.

PASSIONFRUIT

WILT (Fusarium oxysporum f. passiflorae) caused heavy losses and eventual abandonment of a total of 5 acres of young vines in the Duranbah area (N.C.). Losses of individual plants have been recorded from commercial plantings, and home gardens in other parts of the North Coast.

This disease has now been located on six additional properties in the Gosford (C.C.) district, one heavy in the Peats Ridge area. Loss as high as 60 per cent in two year old vines has been observed. This disease is increasing in importance on the central coast.

WOODINESS (Virus). This disease was again present in most plants more than six months old.

BROWN SPOT (Alternaria passiflorae). Severe infection occurred in non-sprayed vines or where sprays were inadequately applied, in most established plantings in coastal districts.

PAPAWS

RIPE FRUIT ROT (Colletotrichum spp.) again took heavy toll of fruit ripening during the winter and spring months especially in exposed plantations.

POWDERY MILDEW (Oidium sp.) was recorded from Murwillumbah and Grafton (N.C.) but in each case was confined to occasional plants.

CRINKLE (virus) was recorded in the Murwillumbah (N.C.) District.

## MISCELLANEOUS FRUITS

### FIG

LEAF SPOT (Cercospora fici) was reported from Hawkesbury Agricultural College, on variety Preston, in March, 1959.

### GRAPES

DOWNY MILDEW (Plasmopara viticola). Conditions favourable to the development of downy mildew occurred in Coastal and Tableland vineyards during summer and autumn, and where sprays were insufficiently frequent or poorly applied, the disease developed. Severe leaf infection was reported from a number of vineyards at Pokolbin (C.C.), Fordwych (C.C.), Molong (C.W.S.), Orange (C.T.), Fairfield (M.A.) and in home gardens throughout the Central Coast, Metropolitan area and at Moree (N.W.P.). Moderate infection of foliage following harvest occurred in many vineyards. In the Lower Murray R. area (W.D.) some mildew development followed a short period of rain and high humidity in late November, but subsequent dry, hot weather prevented extension of the disease. In the Murrumbidgee Irrigation Areas moderate infection of autumn growth was noted.

BLACK SPOT (Elsinoe ampelina). This disease is now well controlled in all vineyards where it has occurred regularly in the past. In the lower Murray R. area where climatic conditions usually prevent its development routine spraying of susceptible varieties is not a general practice. A slight development occurred during late spring in many Coomealla vineyards (W.D.) and at Koraleigh (R) and an extension of this took place in late November and early December following a period of rain and high humidity. Some infection of bunches occurred, but the onset of hot, dry weather prevented the disease from becoming serious.

POWDERY MILDEW (Uncinula necator). This disease was well controlled in most districts. Slight patchy infection of Black Muscat fruit and foliage was reported from Molong (C.W.S.), and of Montils at Pokolbin (C.C.). Most severe damage was caused to currants in Lower Murray vineyards (W.D.), where considerable reduction of size and quality was reported.

DEAD ARM (Phomopsis viticola). Rather extensive spring infection of susceptible varieties occurred in the Griffith area (M.I.A.). The varieties most affected were Cornichon, Palamino and Waltham Cross and to a slightly less extent Grenache, Hunter River Riesling, Frontignac and Pedro Ximinis. The extent of infection of bunch stems of Cornichon was well seen at harvest time. In some vineyards damaged fruit amounted to about 10 per cent of the total crop. Dead arm was also reported from Orchard Hills (M.A.) during early spring, causing shoot and leaf injury, but no damage to bunches. At Rooty Hill (M.A.) some infection of young shoots occurred in Chasselas and Traminer in early spring, and in late summer, following a period of rain, considerable cane die-back resulted from this disease. Cane die-back of Black Muscat also occurred at Orchard Hills (M.A.) during early winter 1959.

FRUIT ROTS. Weather just prior to harvest was unsettled in most grape growing areas and some fruit rotting occurred. WHITE ROT (Coniothyrium diplodiella) was an important cause of loss of the wine varieties - Hunter River Riesling, Pinot, Hermitage, Chasselas and Montils and in

conjunction with BITTER ROT (Melanconium fuligineum) resulted in infection of up to 30 per cent in some vineyards at Pokolbin (C.C.) and Fordwych (C.C.) and 50 per cent at Rooty Hill (M.A.). White rot was also recorded on Cornichon at Wedderburn (S.C.) and Mudgee (C.T.). Bitter rot caused up to 30 per cent loss in late hanging Cornichon at Griffith (M.I.A.). A RIPE ROT caused by Aspergillus niger contributed to losses of Chasselas at Rooty Hill (M.A.) and Sphaeropsis malorum was observed causing minor damage to Black Muscat at Fairfield (M.A.).

MOULD (Botrytis cinerea) was responsible for an overall loss of 10 per cent in wine grapes at Griffith (M.I.A.) plus some loss in quality. Botrytis was not seen in Metropolitan or Hunter River vineyards this season possibly due to rather warm conditions.

CANE CANKER (Botrytis cinerea). A considerable development of cane cankering was observed in the variety Grenache in several Griffith (M.I.A.) vineyards in autumn following harvest. This variety appears to be particularly susceptible to Botrytis attack.

CANE BLIGHT (Pythium sp.). Blighting of young canes of newly planted Palamino vines in a Coomealla vineyard (W.D.) occurred in November, 1958, following a period of rain. Lesions were formed at the base of the green cane, at or slightly below ground level.

LEAF SPOT (Pseudocercospora vitis) was reported to have caused severe post harvest injury at Kyogle (N.C.).

LEAF ROLL (Virus). In the course of a survey of vineyards in the Griffith area (M.I.A.) during March and April, 1959, it was found that visible symptom development in Hunter River Riesling varied from nil to 100%. In the Hunter R. area it is suspected that all H.R. Rieslings are affected. In a vineyard at Wedderburn (S.C.) 20 year old Doradillo on 1202 stock showed about 10% severe leaf roll, and a similar rate of infection was seen in self-rooted Doradillo in a Griffith vineyard. Symptoms suggestive of leafroll were seen in Waltham Cross at Wedderburn (S.C.) and Mudgee (C.T.). The varieties Black Shiraz, White Shiraz, Cornichon, Grenache, Pedro and Black Muscat in vineyards at Griffith and elsewhere showed no trace of infection.

MEASLES (Cause unknown). A severe development of measles was again reported from young vineyards in the Coomealla area (W.D.). Early defoliation and wilting of crops occurred in many vines. Sultana was the variety most affected, but symptoms were also seen in Black Shiraz, Currant, Gordo Blanco and Doradillo. Delayed shooting of individual vines of Currant appears to have been due to this cause. Late in the season measles symptoms developed in most vine growing districts and in many varieties. Gordo Blanco and Hunter River Riesling were the most generally affected but symptoms were also seen in Cornichon, Black Shiraz, Black Muscat and Traminer at Orange (C.T.), Wedderburn (S.C.), Molong (C.W.S.), Griffith (M.I.A.), Pokolbin (C.C.), Rooty Hill (M.A.), Orchard Hills (M.A.) and Fairfield (M.A.).

BUNCH STEM DIE BACK (Cause unknown). Ripening bunches of Black Muscat in vineyards in the Orange district (C.T.) showed considerable development of this disorder during March 1959. Losses ranged from a trace to over 60 per cent and were heaviest in vineyards on red, basalt-derived soils,

slightly less on grey soils and negligible on the granite soils at Molong (C.W.S.). The severity of the disease was less on the least vigorous vines. It developed equally in vines growing on their own roots or on stocks. The disorder is restricted to Black Muscat varieties. Adjacent Gordo Blanco vines in one vineyard showed no trace of die-back. A very slight trace was seen in Black Muscat on Dulot stock at Orchard Hills (M.A.) on basalt soil, but it has never been observed at Fairfield (M.A.), Wedderburn (S.C.) or Liverpool (M.A.) or in the Murrumbidgee Irrigation Area.

POOR GROWTH (Cause undetermined). About 5 per cent of vines of Doradillo in two Coomealla vineyards (W.D.) showed a condition of poor vigour suggestive of virus infection. The vines, which are scattered, grew well for the first 4 years but showed noticeable reduction in vigour after the first heavy crop.

HAIL DAMAGE. A crop reduction in about 20 per cent of Gordo Blanco grapes resulted from a heavy storm in November, 1958, in a large Mallee Cliffs vineyard (W.D.). In other districts storm damage was negligible.

LIGHTNING INJURY. A complete row of about 150 vines of Hunter River Riesling were killed when lightning struck the wires supporting them, in a Griffith vineyard (M.I.A.).

SALT. Following a short period of heavy rain in March 1959, vines in a number of Griffith vineyards (M.I.A.) developed severe salt toxicity symptoms.

RACHITISM (Cause not known). Symptom development was almost unnoticeable in affected vines this season.

MULBERRY

LEAF SPOT (Septogloeum mori). Heavy leaf spot ~~was~~ inspection common throughout the State.

BACTERIAL BLIGHT (Pseudomonas mori). Several instances of severe infection were recorded mostly from coastal districts.

SHOOT BLIGHT (Botryosphaeria ribis). Was recorded for the first time on a mulberry tree at Roseville (M.A.)

OLIVE

PEACOCK SPOT (Cycloconium oleagineum) was reported for the first time in the Murrumbidgee Irrigation Area in October, affecting the variety Sevillano in a Hanwood planting. By March 1959 considerable defoliation had resulted. Slight infection of trees at Cornwallis (C.C.) was noted in February 1959.

FRUIT SPOT (Cercospora cladosporioides) occurred in a Gordon (M.A.) home garden during April 1959.

ROOT KNOT (Meloidogyne incognita var. acrita). Mild infection was reported from a Yoogali (M.I.A.) orchard.

BLUE NOSE (Physiological) and RIPE ROT (Glomerella cingulata) were reported to have affected a substantial proportion of the crop of Drupe and a low proportion of Sevillano fruit in a Stony Point (M.I.A.) planting in April 1959.

STRAWBERRY

VIRUS DISEASES. Very prevalent.

LEAF SPOT (Mycosphaerella fragariae), SCORCH (Diplocarpon earliana) and BLIGHT (Dendrophoma obscurans) were recorded from home gardens in the Metropolitan area during late summer and autumn. Leafspot was recorded from Mudgee (C.T.) in December, 1958.

BLACK ROOT (Cause not established). Pratylenchus sp. and Rhizoctonia solani were associated with the condition in a Mudgee (C.T.) planting. Pratylenchus sp. was also found to be very abundant on the roots of Climax at the Experiment Station, Dareton (W.D.), though Phenomenol, Narara selections and Ettersburg were not visibly affected.

ROOT KNOT (Meloidogyne incognita var. acrita). Slight infection of Richmond Red was reported at Narara (C.C.).

WALNUT.

BACTERIAL BLIGHT (Xanthomonas juglandis) was of widespread occurrence and caused some heavy losses in tableland districts.

## ORNAMENTALS

ASTER (Callistephus chinensis.)

WILT (Fusarium oxysporum f. callistephi) was responsible for the collapse of many plants in a home garden at Orange (C.T.) Many of the varieties once believed to be resistant to wilt now appear to be susceptible.

AZALEA (Rhododendron spp. and hybrids)

LEAF GALL (Exobasidium vaccinii) was found commonly throughout the Metropolitan area during the summer months. It was also recorded at Parkes (C.W.S.) The pink-red varieties such as William Selkirk appear to be the most susceptible.

POWDERY MILDEW (Oidium sp.) was evident in the late summer months on plants growing in the Metropolitan area.

BAUHINIA (Bauhinia sp.)

LIME INDUCED CHLOROSIS caused severe leaf yellowing in a specimen growing in alkaline soil at Gunnedah (N.W.S.)

BEGONIA (Begonia sp.)

POWDERY MILDEW (Oidium sp.) was seen on the leaves of bamboo begonias growing at Forster (C.C.)

CALENDULA (Calendula officinalis)

RUST (Puccinia flaveriae) caused severe leaf yellowing in summer plantings around Sydney (M.A.) and at Faulconbridge (C.T.).

CAMELLIA (Camellia japonica)

LEAF SPOT (Pestolotia guepini) was evident on many trees in the Metropolitan area and at Quirindi (N.W.S.) Spotting occurs in the summer months, the fungus colonising areas injured by sun scalding.

CAMELLIA YELLOW MOTTLE (virus) was noted in leaves taken from a specimen growing at Darby's Falls (C.T.) Only a few leaves showed the mottle pattern and flower production does not appear to be impaired.

CARNATION (Dianthus caryophyllus)

WILT (Fusarium oxysporum f. dianthi) caused severe losses (up to 50 per cent) in home garden and commercial plantings during the late summer and autumn. In the Ryde - Pennant Hills area (M.A.) home garden losses were most severe, while commercial losses occurred in the Cronulla district (M.A.) and Gosford (C.C.) It is believed that infected cuttings were the source of contamination of new areas.

CROWN ROT (Sclerotium rolfsii) caused only minor losses in commercial carnation farms in the Cronulla district (M.A.)

LEAFSPOT (Alternaria dianthi) was troublesome in early summer being recorded at Gladesville (M.A.) and Tamworth (N.W.S.)

ROOT KNOT (Meloidogyne sp.) caused considerable root galling in a home garden planting at Eastwood (M.A.)

CHRISTMAS BUSH. (Ceratopetalum gummiferum)

SALT TOXICITY caused leaf tip burn and severe stem die-back in a number of plants at Dural (M.A.)

CHRYSANTHEMUM (Chrysanthemum morifolium)

ROOT ROT (Phytophthora ? cryptogea) was evident at Griffith (M.I.A.) in autumn following the wet weather of March. Many plants in home gardens were killed.

LEAF NEMATODE (Aphelencoides ritzema - bosi) was observed as brown leaves drooping downwards against the stems in many home gardens and commercial plantings throughout the Metropolitan area.

CLEOME (Cleome spinosa)

ROOT KNOT (Meloidogyne sp.) was recorded on plants growing at Kurri Kurri (C.C.)

CREPE MYRTLE (Lagerstroemia indica)

POWDERY MILDEW (Uncinula australiana) appeared in the summer months on bushes in the Metropolitan area and Dorrigo (N.C.)

SALT TOXICITY produced severe leaf edge scorching in plants growing at Long Jetty (C.C.) and exposed to salt laden winds from the adjacent ocean.

DAFFODIL (Narcissus pseudo-narcissus)

STEM AND BULB NEMATODE (Ditylenchus dipsaci) was evident in bulbs growing at Goulburn (C.T.) and Gingkin (C.T.)

BASAL ROT (Fusarium oxysporum f. narcissi) was responsible for severe losses in a commercial planting at Camden (M.A.) during early summer.

DAHLIA (Dahlia variabilis)

RINGSPOT (Tomato spotted wilt virus) caused severe mottling (and leaf necrosis in very susceptible varieties) in dahlia plantings throughout the state during the summer.

STUNT (virus) caused dwarfing of isolated plants in gardens around Sydney (M.A.), at Lithgow (C.T.) and Singleton (C.C.)

CROWN ROT (Sclerotium rolfsii) was recorded from Taree (C.C.) in January.

CROWN GALL (Agrobacterium tumefaciens) was seen on garden plants at Beecroft (M.A.) and in a commercial planting at Ingleburn (M.A.) during the summer.

ROOT KNOT (Meloidogyne sp.) was responsible for tuber losses (90 per cent) in a commercial planting at Islington (C.C.)

DAISY (Bellis perennis)

RUST (Puccinia distincta) caused severa leafspotting in a home planting at Emu Plains (M.A.)

DAPHNE (Daphne sp.)

ROOT ROT (Phytophthora sp.) was responsible for the death of a number of garden specimens in the Metropolitan area and at Berrigan (R.)

DELPHINIUM (Delphinium hybridum)

POWDERY MILDEW (Oidium sp.) was seen on plants at Annangrove (M.A.) and Wyong (C.C.) during the spring. The infection at Wyong was severe and not checked by spraying with white oil or "Karathane."

EUCALYPT (Eucalyptus sp.)

LEAFSPOT (Septoria sp.) was recorded at Vaucluse (M.A.) during the autumn.

SUGAR GUM (Eucalyptus cladocalyx)

LEAF DISCOLOURATION (undetermined) Several specimens were received from the Metropolitan area showing purple colouration in the leaves and occasionally leaf enation.

BLUE GUM (Eucalyptus saligna)

LEAFSPOT (Mycosphaerella sp.) caused considerable leaf necrosis in a tree at Mortdale (M.A.) during the summer and autumn.

FOXGLOVE (Digitalis purpurea)

LEAFSPOT (Ramularia variabilis) was seen at Mt. Wilson (C.T.) in the late winter. It is invariably present each year and the damage appears unimportant.

GAILLARDIA (Gaillardia aristata)

GREENING (Tomato big bud virus), caused formation of green leaf-like bracts instead of petals in flowers at Gunnedah (N.W.S.)

GAZANIA (Gazania rigens)

CROWN ROT (Sclerotium rolfsii) was recorded for the first time on this host at Lane Cove (M.A.) in February.

GERANIUM (Pelargonium hortorum)

RUST (Puccinia pelargonii - zonalis) was seen on the leaves of zonal varieties received from various parts of the state during the summer and autumn.

BACTERIAL STEMROT (Xanthomonas pelargonii) caused die-back of stems in plants growing at Albion Park (S.C.) during the spring.

GERBERA (Gerbera jamesonii)

LEAFSPOT (Cercospora sp.) was seen on plants growing in gardens around Sydney (M.A.), at Port Macquarie (C.C.) and Grafton (N.C.) during the summer and autumn. The disease was most severe in April - May being favoured by the prevailing warm, moist conditions.

WHITE RUST (Albugo tragopogi) was recorded for the first time on this host at Beecroft (M.A.) in November. Subsequent records were made from gardens in the western suburbs of Sydney (M.A.)

GLADIOLUS (Gladiolus hortulanus)

YELLOWS AND BASAL BROWN ROT (Fusarium oxysporum f. gladioli) was most severe during the autumn being seen on corms received from many parts of N.S.W.

CORM AND NECK ROT (Sclerotinia gladioli)was evident in plantings around Sydney (M.A.) during late spring.

CORM ROT (Penicillium gladioli) caused moulding and decay of corms improperly stored in Sydney (M.A.) gardens during the autumn.

LEAFSPOT (Stemphylium botryosum) was reported from Dundurrabin (N.C.) in February.

ROOT KNOT (Meloidogyne sp.) was recorded for the first time on this host growing at Hawkesbury Agricultural College, Richmond (M.A.) in weed control trial plots. (July, 1958). The cormlets only were infected.

MOSAIC AND FLOWER BREAK (virus) caused leaf mottling in plants growing at Bowraville (N.C.) and flower break in the varieties Spic and Span and Ben Britton grown for cut flowers at Toongabbie (M.A.)

GLOXINIA (Sinningia speciosa)

CROWN ROT (Phytophthora parasitica) was responsible for the decline of several hundred plants in a group of 8,000 growing at Rydalmere (M.A.) in January. Affected plants were approaching flowering.

GREVILLEA (Grevillea sp.)

SALT TOXICITY caused leaf browning and stem dieback in garden plants at Sandy Hollow (C.C.)

HOLLYHOCK (Althaea rosea)

RUST (Puccinia malvacearum) was evident in garden plants at Belmore (M.A.), Tahmoor (M.A.) and Leura (C.T.) during the winter and spring.

HYDRANGEA (Hydrangea macrophylla)

LIME INDUCED CHLOROSIS caused leaf yellowing and premature leaf falling in a number of plants growing in alkaline soil at Sandy Hollow (C.C.)

POWDERY MILDEW (Oidium sp.) was evident in gardens around Sydney (M.A.) and Grafton (N.C.) during the spring.

ICELAND POPPY (Papaver nudicaule)

SPOTTED WILT (Tomato spotted wilt virus) was observed causing severe distortion and yellowing of plants growing at Campbelltown (M.A.) in the winter. The affected plants failed to produce salable blooms.

IRIS (Iris germanica - Bearded iris)

LEAFSPOT (Heterosporium iridis) caused severe spotting of leaves in a planting at Orange (C.T.) during the autumn.

SOFT ROT (Erwinia caratovora) was responsible for extensive rhizome and fan decay in expensive varieties growing at Gleniffer (N.C.) under very wet autumn conditions. The

grower who found that P.M.A. drenching was giving no control under prolonged rain used a rhizome dip of a commercial antibiotic "Strinacin" (streptomycin + sulphur drugs) with apparent success.

(Iris xiphium - Dutch iris)

MOSAIC (virus) was recorded in a commercial planting at Ingleburn (M.A.) during the winter. Plants showing the characteristic silver mottling were constantly rogued and burned.

LILY (Lilium auratum)

MOSAIC (virus) was seen in plants growing at Bowral (S.C.) in the late summer.

BASAL ROT (Fusarium oxysporum f. lilii) was also seen in the Bowral (S.C.) plants.

(Lilium speciosum)

LEAFSPOT (Botrytis sp.) was noted on the leaves of garden plants growing on the Blue Mountains (C.T.) during late summer.

LINUM (Linum trigynum)

SHOOT BLIGHT (Botrytis cinerea) was observed causing mild damage in a garden at Pennant Hills (M.A.) during the winter.

OLEANDER (Nerium oleander)

BACTERIAL GALL (Pseudomonas tonelliana) caused severe galling of leaves, buds and twigs on plants in metropolitan gardens, and at Parkes (C.W.S.) and Urana (R.) during the spring and summer.

PETUNIA (Petunia hybrida)

WATERY STEM ROT (Sclerotinia sclerotiorum)was recorded in a home planting at Narara (C.C.) during the winter.

POPLAR (Populus nigra)

ROOT ROT (Armillaria mellea) was observed in a plant growing at Connell's Point (M.A.). The affected plant is growing in an avenue of 15 year old trees.

PYRACANTHA (Pyracantha sp.)

RIPE ROT (Colletotrichum sp.) was recorded on the berries of plants growing at Blakehurst (M.A.) during the autumn. The berries on affected plants blackened instead of turning orange.

RHODODENDRON (Rhododendron spp. and hybrids)

LEAF AND SHOOT BLIGHT (Botrytis cinerea) was seen on seedlings, cuttings, and nursery plants of various species and varieties growing at Mount Wilson (C.T.) during December when prolonged periods of mist occurred.

ROSE (Rosa spp. and hybrids)

ROSE WILT (virus) was responsible for severe losses (5 - 10 per cent) in nurseries during the spring and summer. The incidence in home gardens was negligible, however, being recorded in Sydney gardens and at Tamworth (N.W.S.)

BLACKSPOT (Actinonema rosae) caused severe yellowing and premature falling of leaves of roses throughout the State during the summer and autumn.

POWDERY MILDEW (Oidium sp.) was noted on the leaves, young stems and buds of plants throughout New South Wales during the summer and autumn.

ANTHRACNOSE (Sphaeceloma rosarum) was common in Sydney (M.A.) gardens during the summer.

STEM CANKER (Coniothyrium fuckelii) caused dieback of stems in garden plants at Gunnedah (N.W.S.) and Graman (N.T.) during the winter.

BLOSSOM BLIGHT (Botrytis cinerea) was reported from Kyogle (N.C.) where severe petal spotting occurred in early winter.

CROWN GALL (Agrobacterium tumefaciens) was recorded on plants received from Curlewis (N.W.S.)

MOSAIC (virus) was seen as a yellow mottling in the leaves of plants growing at Tamworth (N.W.S.) in the spring.

SALT TOXICITY caused leaf edge browning and stem die-back in plants at Sandy Hollow (C.C.), Yeoval (C.W.S.), Hillston (R.), Aberdeen (C.C.) and The Entrance (C.C.) during the summer.

LIME INDUCED CHLOROSIS resulted in leaf yellowing of plants growing at Currabubula (N.W.S.)

MUTIFLORA STOCK (Rosa multiflora)

LEAFSPOT AND STEM CANKER (Cercospora rosicola) caused severe losses in a commercial planting at Kellyville (M.A.) Stem canker completely encircled canes to be used as standard stocks.

SNAPDRAGON (Antirrhinum majus)

RUST (Puccinia antirrhini) was evident in metropolitan gardens, and at Leeton (M.I.A.), Narrabri (N.W.P.) and Bathurst (C.T.) during the summer.

STAGHORN (Playtcerium sp.)

BASAL ROT (Rhizoctonia sp.) was recorded for the first time on plants at Burwood (M.A.)

STOCK (Matthiola incana)

BLACKROT (Xanthomonas incanae) was evident in seedling stocks and mature plants received from gardens and commercial plantings throughout New South Wales during the autumn and winter.

SWEETPEA (Lathyrus odoratus)

SHOOT BLIGHT (Broadbean vascular wilt virus) caused severe losses (50-100 per cent) in commercial plantings at Ryde (M.A.) and West Pennant Hills (M.A.) and in many metropolitan gardens during the spring and autumn.

ROOT ROT (various fungi) was noted in home gardens around Sydney(M.A.) and Kyoglo (N.C.) during the autumn and winter.

UMBRELLA TREE (Brassaia actinophylla)

LEAFSPOT (Itersonilia sp.) was observed on a few seriously affected plants in a commercial glasshouse planting of 10,000 at Wyong (C.C.) This is a new record for New South Wales.

VERONICA (Veronica imperialis)

LEAFSPOT (Septoria sp.) was recorded on a garden specimen at Armidale (N.T.) in late autumn.

VIOLET (Viola odorata)

SCAB (Sphaeceloma violae) was severe on leaves and stems of plants growing at Ryde (M.A.) in the autumn.

WATTLE (Acacia elata)

LEAFSPOT (Mycosphaerella sp.) was recorded on plants growing on Tabarac Ridge (C.T.) in the summer.

WITCH HAZEL (Hamamelis mollis)

SALT TOXICITY caused severe stem dieback in a colliery garden at Newcastle (C.C.)

ZINNIA (Zinia elegans)

SPOTTED WILT (Tomato spotted wilt virus) caused moderate losses in metropolitan gardens during the summer.

POWDERY MILDEW (Oidium sp.) was severe on the leaves and even ray florets of plants growing at Baulkham Hills (M.A.) in late summer.

COLLAR ROT (Sclerotium rolfsii) was noted in a garden at Kotara (C.C.) in the early summer.

# VEGETABLES

## ASPARAGUS:

No records.

## BEAN:

### BEAN SEED CERTIFICATION SCHEME.

In co-operation with the Division of Plant Industry, the Bean Seed Certification Scheme was continued for the sixteenth successive season. Fewer crops were planted for certification this season because of the large surplus of bean seed available from last seasons harvests in N.S.W., Queensland and Victoria. Of 85 crops inspected, 48 were certified and 3 approved for growing for certification next season. Of the 34 crops not certified, 9 were rejected because of the presence of halo blight, 1 because of anthracnose, 6 were destroyed by rain and 18 picked for green beans.

Testing of a large number of single plant selections from several lines of the Vickery strain of Brown Beauty showed that this line, which was released several years ago as resistant to strain 1 of anthracnose, is now contaminated with susceptible types to the extent of about 30 per cent. A selection and testing programme has been started, in co-operation with the Bean Seed Certification Officer, to try and re-establish the 100 per cent resistance of this line and the rules of the Certification Scheme have been altered so as to minimise the chance of mixing of different lines of seed. It is felt that this has probably been the main source of the susceptible plants in the Vickery strain.

RUST (Uromyces appendiculatus) was recorded from all coastal bean growing areas during the year and was especially severe in autumn grown crops. Severe infection was also seen in some crops at Gosford (C.C.) in October, 1958 and it is very unusual to see such heavy rust infection in spring-grown beans in this district.

ANTHRACNOSE (Colletotrichum lindemuthianum) has been present in several crops in all coastal bean growing districts during the season and was also found in several consignments of beans arriving at the Sydney Municipal Markets.

During the year, work on the production of a dwarf bean resistant to anthracnose has continued. In a field trial carried out during the year with over three hundred cross-bred lines, some in advanced generations, several were seen to be very promising commercial types. Glasshouse inoculation tests have shown that some of these are resistant to the most common race of anthracnose in N.S.W. These lines include crosses of Hawkesbury Wonder X Westralia (and the back-cross to Hawkesbury Wonder), Hawkesbury Wonder X Kentucky Wonder and Stringless Black Valentine X Westralia. As well as these, several lines of the interspecific cross of Hawkesbury Wonder X Scarlet Runner (Phascolus coccineus) have been tested in the second generation and the resistant lines are being carried on for back-crossing to Hawkesbury Wonder. Numerous sterility problems are associated with this cross and the yield of seed from the F 2 plants is quite small in most cases.

Several commercial varieties introduced from England and Denmark were also tested for anthracnose resistance and

many of these have been found resistant to the most common race in this State. These are mostly high-yielding dwarf varieties and many should be suitable as breeding parents.

Of the wild Phaseolus vulgaris and other Phaseolus spp. obtained from Central America, it has only been possible to obtain flowers on two introductions. Others have made abundant vegetative growth but have not produced flowers. It was realised at the beginning that the light requirements of many of these lines were very specific and unless suitable light conditions are provided, the majority of this material could not be used in breeding work here. Two lines, however, flower well. One of these is a dwarf navy type, with black seeds, and a very heavy yielder and is resistant to anthracnose (and most probably to rust, although no definite inoculation tests have been carried out). This line will definitely be incorporated in future bean disease breeding work.

HALO BLIGHT (Pseudomonas phaseolicola) Was seen in several spring crops at Gosford (C.C.) and in one case it appeared quite definite that seed transmission was responsible for the introduction of the disease to the crop. The seed concerned was a line of N.S.W. certified seed and one or two plants with primary seed infection symptoms were found and it was from these that the patches of halo blight were developing. It was estimated that the amount of seed contamination with the disease was of the order of 1 infected seed in 50,000 healthy ones and this emphasizes the difficulty of producing seed absolutely free of halo blight and also the danger of even a very slight seed carry-over. The line of seed concerned has been eliminated from the certification scheme.

Several other cases of halo blight were seen in coastal bean crops and a number of crops on the Far South Coast were rejected because of its presence.

BACTERIAL BROWN SPOT (Pseudomonas syringae). Was in epidemic proportions in spring crops at Gosford (C.C.) and severe leaf damage and pod spotting occurred.

AMERICAN COMMON BLIGHT (Xanthomonas phaseoli). Caused severe damage to some cross-bred and introduced lines of beans at Richmond (M.A.) and was also seen in a crop at Port Macquarie (C.C.)

RHIZOCTONIA STEM ROT (Rhizoctonia sp.) Was prevalent in many young bean plantings during the summer and autumn months. Plants are seen to die off individually scattered through a planting and in severe cases up to 40 per cent of plants may be killed. This year, the disease was favoured by the warm, moist autumn.

A few cases of seed transmission of Rhizoctonia in bean seed were also recorded this year. This has probably been happening for some time but has not previously been recorded in this State.

OTHER DISEASE recorded this year was : LEAF SPOT (Ascochyta sp.) which caused severe leaf damage to Blue Lake climbing beans at Mt. Wilson (C.T.) and to several dwarf varieties at a commercial trial grounds at Dundas (M.A.), POWDERY MILDEW (Oidium sp.) which resulted in the dropping of young pods in a crop at Murwillumbah (N.C.), ANGULAR LEAF SPOT (Isariopsis griseola) which caused severe damage in an autumn crop at Richmond (M.A.) and ROOT KNOT (Meloidogyne sp.) which was reported from Duranbah (N.C.)

BEAN, BROAD

VASCULAR WILT (BROAD BEAN VASCULAR WILT VIRUS) was recorded from one crop at The Oaks (M.A.) causing quite severe damage.

INTERNAL BLACKENING OF POD WALLS (Undetermined) was very severe in one crop grown at Blackheath (C.T.). The crop was an early spring one and the pods were ripening under very dry conditions and it was suspected that the poor water supply was resulting in the death of tender tissues on the inside wall of the pods.

BEETROOT AND SILVER BEET

BEET NEMATODE (Heterodera schachtii). This nematode was found on beetroot and swede turnip in a home garden at Mascot (M.A.). Infestation of both hosts was heavy, and had considerably reduced yield. A subsequent survey showed that certain sections of the property were infected with this nematode. The nematode was also found to be infesting a number of old established market gardens at Brighton-le-sands (M.A.) where it had caused some reduction in yield of beetroot crops.

Previously, the beet nematode had been found in the Metropolitan Area at Mascot and Milperra. However, the additional records made during this year would indicate that this nematode is probably present on a number of the older market gardening properties situated on light soil in the eastern and southern sections of the Sydney Metropolitan Area.

ROOT KNOT NEMATODE (Meloidogyne javanica) was recorded for the first time on beetroot in this State at Coff's' Harbour (N.C.) Infestation was severe on plants in a home garden. This nematode has probably been previously recorded as Heterodera marioni.

LEAF SPOT (Cercospora beticola). was recorded during the year on beetroot and silver beet in home gardens in the Metropolitan Area, at Avoca and Maitland (C.C.) and Orange (C.T.) There were no reports of losses in commercial plantings.

STEM ROT (Sclerotium rolfsii). Destroyed several plants of silver beet in a home garden at Carlingford (M.A.) during late summer.

CARROT

LEAF BLIGHT (Cercospora sp.) Caused severe damage to carrot crops at Griffith (M.I.A.) and Sunnyside (N.T.). At Griffith, 25 acres of carrots were affected. Spotting began at the leaf margins and advanced rapidly, distorting and twisting the leaves and finally, killing them. There was abundant sporulation of the fungus on the diseased plant parts. A spray consisting of 2 lbs. of Zineb in 100 gallons of water was used against the disease and found to be highly successful in controlling it, even when crop infection was considerably advanced.

LEAF BLIGHT (Alternaria dauci) Caused severe damage to 3½ acres of carrots in the Murwillumbah district (N.C.).

ROOT CANKER (Undetermined) Was recorded from Griffith (M.I.A.) and Sunnyside (N.T.). A species of Cylindrosporium was found associated with the cankers from Griffith whilst a species of Rhizoctonia of the solani type was probably the cause of those from Sunnyside.

CELERY

LEAF SPOT (Septoria apii-graveolentis) Was recorded from Mittagong (S.C.) where severe leaf damage was caused.

CRUCIFERS

CLUB ROOT (Phasmodiophora brassicae) Caused losses in some commercial cauliflower crops at Richmond and Windsor (M.A.) Using a 2 per cent calomel-talc slurry transplanting treatment one grower obtained complete control of the disease whereas 50-60 per cent loss occurred in a neighbouring untreated crop. At Kelso (C.T.) club root caused the complete failure of a ½ acre cauliflower crop. The disease was also recorded on kohl-rabi at Gladesville (M.A.).

DAMPING OFF AND WIRE STEM (Rhizoctonia solani) Caused moderate to heavy damage in some cauliflower seed beds at White Rock and Georges Plains (C.T.) in summer. Wirestem was also present on cabbages at Port Macquarie (N.C.) in April and cauliflowers at Bathurst (C.T.).

DOWNY MILDEW (Peronospora parasitica) caused heavy damage in a Brussels sprouts seedbed at Yetholme (C.T.) and in cauliflower seed beds at White Rock (C.T.) The record on Brussels sprouts is the first for this State.

A heavy attack on cabbage plants in the field occurred at Emu Plains (M.A.) in June. Infection was evident on the middle head leaves of mature plants and had reduced the market value of the crop by 10-20 per cent. In later sown plants downy mildew was heavy on the outer leaves.

BLACK ROT (Xanthomonas campestris) was of little economic importance during the year in commercial crops. Records were made on cabbage and cauliflower in the Sydney Metropolitan Area and on cauliflower at Maitland (C.C.) and Eglington (C.T.).

ALTERNARIA LEAF SPOTS (Alternaria brassicicola and A. brassicae). A. brassicicola caused heavy spotting of leaves and seed stalks in a cauliflower seed crop at Maraylya (M.A.) and Maitland (C.C.). This fungus was also recorded for the first time in this State on Swede and Turnip at Tamworth (N.W.S.). A. brassicae caused moderate leaf spotting of turnip and swede at Oberon (C.T.). A. brassicae was recorded for the first time in this State, on wild mustard, at Maraylya (M.A.). Both fungi were present on cauliflowers at Taree (C.C.).

BLACKLEG (Phoma lingam) caused a 50 per cent reduction in a crop of cauliflower at Bathurst (C.T.) and was also recorded on this crop at Sutton Forest (S.T.).

BEET NEMATODE (Heterodera schachtii) was recorded for the first time in this State on swede turnip and cabbage, at Botany (M.A.). In the home garden planting concerned, infestation of the swede roots was heavy, resulting in considerable reduction in root size. The roots of the cabbage plants were slightly attacked.

ROOT KNOT (Meloidogyne javanica)was recorded for the first time, on horseradish, in this State, at Gosford (C.C.).

SCLEROTINIA ROT (Sclerotinia sclerotiorum) was recorded on Brussels sprouts for the first time in this State at Yetholme (C.T.). Wet autumn weather had favoured a heavy infection of the lower sprouts on plants on one property but, during subsequent dry weather, the disease became less active, The grower stated that the disease was general throughout the Yetholme area. Sclerotinia rot was also recorded on cabbage at Richmond (M.A.).

WHITE LEAF SPOT (Cercosporella brassicae) caused some damage to turnip and swede plants at Oberon (C.T.) and also moderate leaf spotting of cabbage plants at Yetholme (C.T.).

WHITE RUST (Albugo cruciferarum) was recorded on wild turnip at Gunnedah (N.W.S.) and on radish at Kensington (M.A.).

RING SPOT (Mycosphaerella brassicicola) was present on cabbage crops at Bowral (S.C.) in late winter.

MOSAIC (? Cauliflower Mosaic Virus). Symptoms resembling those described for this virus disease were observed on some cauliflower plants growing in a commercial trial ground at Dundas (M.A.) and also was fairly prevalent in a commercial cabbage crop at Emu Plains (M.A.).

BORON DEFICIENCY caused heavy reduction in some crops of cauliflowers at Richmond and Windsor (M.A.), being particularly severe in lighter soils. The deficiency was also recorded in Brussels sprouts at Rydal (C.T.), in cauliflower at Bathurst (C.T.) and also caused 10-20 per cent reduction in a cauliflower crop at Cowra (C.T.). A severe deficiency was also reported in a cauliflower crop at Bolwarra (C.C.).

WHIPTAIL (Molybdenum deficiency) was recorded in some crops of Nugget cauliflower at Windsor and Richmond (M.A.). In one known instance the plants had been given two applications of sodium molybdate in the seedbed but were growing on unlimed soil. Molybdenum deficiency was also recorded in cabbages at Robertson (S.C.). 100 per cent of a planting of the Copenhagen Market variety was involved.

CUCURBITS

POWDERY MILDEW (Oidium sp.) caused heavy damage to crops of cucumber and squash at Coff's Harbour and Macksville (N.C.) in late spring. Heavy foliage infection occurred and the exposed fruit became sunscalded. The disease was also present on rockmelons at Port Macquarie (N.C.) in December. Watermelon crops at Maitland (C.C.) were lightly affected during January and the disease as usual occurred on cucurbit crops in the Sydney Metropolitan Area in late summer and autumn. The rockmelon variety Spartan Rock was moderately to heavily attacked in a home garden at Merrylands (M.A.).

The resistance of the P.M.R.45 rockmelon variety broke down on the lower Murray Area (W.D.) and on the Murrumbidgee Irrigation Areas this year. This is the first occasion on which P.M.R.45 is known to have been attacked by powdery mildew in commercial plantings in New South Wales and indicates that a change has occurred in the fungus concerned or a new race of the fungus previously present has arisen. The identity of the fungus causing powdery mildew of rockmelon in New South Wales has never been definitely determined as the perfect stage has not been observed. In the past it has been assumed that the pathogen was Erysiphe cichoracearum but recently it has been claimed (Clare (1958) Aust. J. Sci. 20: 273) that the powdery mildew of rockmelon and other cucurbits in South Eastern Queensland is caused by Sphaerotheca fuliginea.

At Boeil Creek on the lower Murray (W.D.) powdery mildew infection was heavy on most P.M.R.45 plants on one property although it was thought that some plants appeared to show varying degrees of resistance. Plantings of P.M.R.5 and P.M.R.6 in the same field were free of the disease. In another crop of P.M.R.45 at Boeil Creek an outbreak of powdery mildew was controlled to a reasonable extent by application of a karathane spray.

During the late summer and autumn, powdery mildew was prevalent on P.M.R.45 on the Murrumbidgee Irrigation Areas. Here also P.M.R.5 and P.M.R.6 were highly resistant to the disease in the Plant Breeder's trials at Yanco Experiment Farm along with the varieties Edisto, Mildew R.D.2 and Rio Sweet x 7046. All the rockmelon crosses derived from P.M.R.45 were susceptible.

FUSARIUM WILT OF ROCKMELON (F. oxysporum f. melonis) was present in the Griffith section of the Murrumbidgee Irrigation Areas in spring plantings. The disease was severe in the susceptible Hales Best variety but Spartan Rock showed high resistance in infested soil. In tests at Yanco Experiment Farm (M.I.A.) the varieties Spartan Rock and Delicious 51 showed very high resistance to Fusarium wilt.

DOWNY MILDEW (Pseudoperonospora cubensis) caused moderate damage in a rockmelon crop at Port Macquarie (N.C.) in December. The disease was present in epidemic form at Narara (C.C.) in February, causing death of an experimental cucumber planting, and also caused damage to cucumbers at Dora Creek and Avoca (C.C.).

Under conditions which were very favourable to the disease in autumn the reaction of a number of cucumber varieties was well illustrated in a commercial trial at Dundas (M.A.). In this trial the variety Palmetto showed the highest resistance and varieties Ashley and Stono were highly resistant. Strain 343 of the variety Santee showed some resistance but strain 102 of this variety showed only slight tolerance. The varieties Early Fortune, Marketer and Palomar were very susceptible to the disease.

ANTHRACNOSE (Colletotrichum orbiculare) caused moderate to heavy damage in rockmelon crops at Maitland (C.C.) in summer. Where crops were sprayed regularly with zineb little loss was experienced. A heavy attack on anthracnose occurred on the variety Spartan Rock in a home garden planting at Merrylands (M.A.).

SEPTORIA LEAF SPOT (Septoria cucurbitaceaarum). A moderate leaf infection occurred in a crop of gherkins at Kurrajong (C.T.). This disease is of rare occurrence in New South Wales.

FUSARIUM FOOTROT (Fusarium solani f. cucurbitae). This disease was recorded once during the year on pumpkin at Parkes (C.W.S.).

LETTUCE

MOSAIC (Virus) was widespread again this year in most lettuce growing districts. Infection appears to be related to infestation of lettuce plants by the aphid Macrosiphum euphorbiae and a comprehensive insecticide spray programme has been recommended. The lettuce seed at present available in this State appears to be of very high quality as far as freedom from seed-borne mosaic is concerned.

SPOTTED WILT (Virus) was present in many lettuce plantings on the Central Coast and caused losses of up to 10-15 per cent.

BIG VEIN (Undetermined) was seen in several lettuce plantings in the Metropolitan Area and also caused severe damage to a crop at Murrumburrah (S.W.S.). This latter crop was showing 100 per cent infection and many of the plants were breaking down with a secondary bacterial soft rot, which

appeared in many cases to have started at the enlarged veins and mid-rib of the outer leaves. All plants showing big vein symptoms were seen to have resting sporangia of Olpidium brassicae in their roots. This is in agreement with recent findings in the U.S.A. and New Zealand.

It appears possible that big vein is much more common in lettuce plantings in N.S.W. than previously thought and some confusion has occurred in the past between severe symptoms of lettuce mosaic and big vein.

BOTTOM ROT (Rhizoctonia sp.) caused severe damage to a planting of 16,000 lettuce plants at Cudgen (N.C.). 50 per cent of the planting was lost due to this disease.

DOWNY MILDEW (Bremia lactucae) was present in small amounts in many spring crops.

MUSHROOM

NEMATODES. The mushroom spawn nematode (Ditylenchus myceliophagus) was identified from failing mushroom beds for the first time in this State during the year. The nematode was found in beds which had given low production at Maraylya, Dural and Kingswood (M.A.) and it would appear to be now present wherever mushrooms are grown in the Sydney Metropolitan Area. The exact source of infestation of the composts by this nematode is not clear as it has not been detected in soils used for casing, soils on which ridge beds and compost heaps are located or in the animal manure or animal manure-straw mixtures used for making the composts.

Rhabditis nematodes, predominantly R. terricola, were found in large numbers in some unproductive beds in the Maraylya-Windsor area (M.A.). These nematodes occur at high population levels in the animal manure and animal manure-straw mixtures used for composts and survive the composting process to infest the beds. In the absence of peak heating facilities control is difficult but it was found that fumigation of the composted heap with methyl bromide at the rate of 1 lb. per 100 cubic ft. of compost was a promising means of control.

MAT DISEASE (Myceliophthora lutea) was recorded for the first time in this State at Maraylya (M.A.) during the year. The disease occurred in some 400 square feet of bed and production in the infested area of bed was severely depressed. The pattern of infestation of the bed by the fungus indicated that the casing soil was the source of infestation.

BUBBLES (Mycogone perniciosa) was recorded on two occasions, at Cattai (M.A.) the infection apparently arising from the casing soil. Loss of crop in each case was about 5-10 per cent. One grower had controlled the disease by spraying with zineb (1 lb/40 gallons) without any detrimental effect of the mushrooms.

TRUFFLE (Diehliomyces microsporus) was recorded twice from the Metropolitan Area but the infestation had little effect on production.

Other fungus competitors recorded during the year were inkcaps (Coprinus sp.), brown plaster mould (Myriococcum praecox) and a species of Cyathus. These competitors caused little yield loss in the beds invaded.

OKRA

DAMPING OFF (Rhizoctonia solani) caused heavy damage to seedlings at Windsor (M.A.).

ONION

WHITE ROT (Sclerotium cepivorum) caused severe damage to onions at New Lambton (C.C.) and ROOT ROT (Undetermined) was responsible for the loss of several plantings of seedlings at Mudgee (C.T.). The cause of this root rot is unknown but the presence of the pink root fungus (Pyrenochaeta terrestris), which has not been recorded in N.S.W., is suspected. One pycnidium characteristic of this fungus was found on one seedling but it was not possible to isolate the organism in pure culture.

PARSNIP

ROOT KNOT (Meloidogyne javanica) caused a 60 per cent reduction in yield in ½ acre of parsnips at Griffith (M.I.A.).

CANKER (Itersonilia sp.) has become so severe on several market gardens at Matraville (M.A.) that parsnip growing is no longer profitable and this crop has been dropped from the rotation by several growers.

PEA

FOOT ROT and LEAF SPOT (Mycosphaerella pinodes) continued to cause severe damage to peas in all pea growing areas during the year. It was most severe, however, in autumn-grown crops in coastal districts. Plants are rarely killed completely but the attack on the lower stem stunts the plant and considerably reduces the yield.

Some spraying trials were carried out in the Camden district (M.A.) during the autumn to see if any control of the stem rot phase of this disease could be achieved. The sprays used were zineb (2 lbs/100 gallons water) and copper oxy-chloride (2 lbs/100 gallons water) applied fortnightly through a 5-row boom spray. No control was obtained with these treatments. It was found that, even with the addition of wetters, the plants were very hard to wet and it was very difficult to obtain good coverage with the fungicides.

Work is also being carried out on conditions influencing the spread and development of the disease and the survival of the causal fungus in pea trash in the soil.

Examination of samples of pea seed have shown that about 50 per cent of the lines of pea seed sold locally are carrying M. pinodes as an internal contaminant. The degree of contamination is, however, very slight, usually less than 1 per cent. The importance of this seed infection in spreading the disease in this State is not known but it is felt that it probably only plays a minor part compared with air-borne ascospores.

Preliminary trials using hot carbon tetrachloride (70°C for 20, 40 and 60 minutes) have shown that this method may be of value in freeing small lots of seed from internal contaminants. Some loss of germination occurred in those tests.

ROOT ROT (Phytophthora sp.) was recorded for the first time in N.S.W. from a crop of the variety William Massey

growing at The Oaks, near Camden (M.A.). Plants growing in the damper parts of the paddock were the only ones affected and were stunted and their lower leaves were yellowing and dying. When the lower stem was split open, a distinct red vascular discolouration was seen. A species of Phytophthora was isolated from this tissue. Further work is being carried out on this disease.

OTHER DISEASES recorded this year were LEAF AND POD SPOT (Ascochyta pisi), which caused severe damage to young peas at Casino (N.C.), STEM ROT (Rhizoctonia sp.) of seedlings during the warm, moist autumn at Port Macquarie (C.C.), BACTERIAL BLIGHT (Pseudomonas pisi) in an old crop at Murwillumbah (N.C.) and FROST INJURY (non-parasitic), which caused severe damage to early spring crops at Bathurst (C.T.), splitting stems and damaging buds and flowers.

PEPPER (Capsicum)

SPOTTED WILT (Tomato Spotted Wilt Virus). A 2 per cent infection was recorded in a commercial crop at Griffith (M.I.A.).

POTATO

EARLY BLIGHT (Alternaria solani) caused significant yield depression generally on the Tableland crops last season, the disease being favoured by wet, muggy weather which was experienced from flowering onwards. On the Northern Tablelands, the disease appeared in February and quickly spread throughout the crops, resulting in an ultimate reduction in tuber size. Varying degrees of infection were observed in varieties and seedlings grown at Glen Innes (N.T.) as part of this Department's potato breeding programme, but there did not appear to be any promising resistance to early blight among these varieties and seedlings.

On the Central Tablelands crops at Oberon and Meadow Flat became infected in March and some yield losses resulted from the subsequent widespread infection in those areas. At Blayney, Millthorpe and Orange (C.T.) the disease was fairly widespread in February but subsequent dry weather checked its advance and no significant yield loss resulted.

Early blight commenced to appear in the Crookwell section of the Southern Tablelands in late February and subsequently caused severe damage in crops in the Cotta Walla and Bannister Certified Seed Associations. Yield of some crops was estimated to be reduced by 50 per cent in these Associations and the general reduction would have been in the order of 10-20 per cent. The red skinned varieties Crana, Pontiac and Aussie were the most severely affected and Walanga showed the highest field resistance.

In the Batlow section of the Southern Tablelands, early blight appeared in late February and in some cases individual crops were heavily attacked with subsequent yield reduction.

Some heavy infections were also present in individual crops in the Maitland area (C.C.) during the autumn.

BROWN ROT (Pseudomonas solanacearum) caused severe losses in some small plantings in the Sydney Metropolitan Area and on the Central and North Coast but there were no reports of large scale losses in commercial crops.

POWDERY DRY ROT (Fusarium trichothecioides). In contrast to the previous season, little dry rot was present in

certified seed produced in the Crookwell area (S.T.). In general, consignments reaching the coast from Crookwell showed an average of 1-2 per cent dry rot although in four individual consignments infection in the order of 10-16 per cent was present. The varieties concerned were Sebago and Crana. This season the usual killing frosts had occurred at Crookwell and most growers exercised all practical care during digging and post digging operations to minimize injury to the tubers. 10 per cent powdery dry rot was observed in one consignment of potatoes from Kings Plains (C.T.).

LATE BLIGHT (Phytophthora infestans). Some development of this disease occurred in crops in all sections of the Tablelands, but there were no records of losses due to tuber rotting.

Testing work on the reaction of a number of this Department's seedlings to the "O" race of the fungus has been continued. This year's tests showed that a number of seedlings derived from the U.S. variety Cherokee and the Scottish seedlings 1928e(2) and 914a(91) were immune to the "O" race.

VIRUS DISEASES: For the fourth successive season no crops submitted on the Tablelands for certification were rejected for excess leaf roll content indicating that a high level of freedom from this disease is being maintained in certified seed potato stocks. Mosaic diseases also were not recorded in crops submitted for certification. Purple top wilt (Tomato big bud virus) was present in trace amounts on the Southern Tablelands.

OTHER DISEASES including COMMON SCAB (Streptomyces scabies), BLACKLEG (Erwinia carotovora), ROOT KNOT (Meloidogyne sp.) and BROWN FLECK (non-parasitic) were recorded on some occasions during the year but resulted in no significant damage to the crops.

RHUBARB

Little losses were caused by diseases in rhubarb plantings. DOWNY MILDEW (Peronospora jaapiana) was recorded from Clarencetown (C.C.) and Wagga (S.W.S.) and LEAF SPOT (Phyllosticta straminella) was recorded from the Sydney Metropolitan Area.

TOMATO

SPOTTED WILT (Spotted wilt of tomato virus). The most serious losses of tomatoes due to spotted wilt reported during the year were in the Griffith district of the Murrumbidgee Irrigation Areas where an incidence of 4 per cent occurred in most crops with 10 to 15 per cent in individual crops. 80 of 100 plants were infected at Kyogle (N.C.). The disease was also reported from Cowra (C.W.S.) and was widespread but of minor importance in the Sydney Metropolitan Area. Infection was confined chiefly to the months of November, December and January.

YELLOW TOP (Yellow top of tomato virus) was widespread from the Sydney Metropolitan Area to the far north coast. Individual losses of 50 per cent at Cudgera (N.C.), 100 per cent at Narara (C.C.) and 50 to 70 per cent in several crops at Glenorie (M.A.) were reported. Otherwise losses within crops generally ranged from nil to 5 per cent. Losses occurred throughout the growing season.

EARLY BLIGHT (Alternaria solani). As usual early blight was present in almost all crops during January to June.

Incidence was generally inversely proportional to the frequency of sprays applied. The stem-girdling phase was reported from Cardiff (C.C.) in March.

FUSARIUM WILT (Fusarium oxysporum f. lycopersici). The most serious loss reported was 80 per cent of 8000 plants of the variety Rouge de Marmande at Fairfield (M.A.) in November. 60 per cent wilt occurred in an unidentified variety at Dora Creek (C.C.) in January. Losses occurred in some crops of Grosse Lisse in many districts. As usual trace losses were experienced in Mona Vale-Warriewood (M.A.) glass-houses despite soil-fumigation with E.D.B.-Chloropicrin or steam.

BACTERIAL SPOT (Xanthomonas vesicatoria). The only records of bacterial spot received this season were from the north coast where there was a mild infection at Cudgen in July, a 50 per cent infection of one crop at Lismore in September, heavy infection at Macksville and Coff's Harbour in November and a severe outbreak on the Condong Range in June 1959.

BACTERIAL CANKER (Corynebacterium michiganense). Although reports were received from several areas the incidence of the disease was at a much lower level than last season. This may be the result of publicity and the co-operation of seed merchants in treating seed in acid. Specimens of canker were received from a home garden in Lismore (N.C.) and from commercial crops at Horsley, Carlingford and Cecil Park (M.A.) and Duranbah (N.C.).

BACETRIAL WILT (Pseudomonas solanacearum)was again common on the north coast; however, serious injury was reported in only one crop - at Condong (N.C.) in May 1959.

ROOT and COLLAR ROTS. Some losses were caused by Rhizoctonia and Phytophthora in the Warriewood-Mona Vale (M.A.) and Menindee (W.D.) districts. In the latter case individual houses were seriously affected. Damping off caused by Pythium sp. also occurred in flats of seedlings supplied by a nursery at Botany (M.A.) to a grower at Hoxton (M.A.).

STEM BLIGHT (Sclerotinia sclerotiorum) was an important disease on the north coast during the cooler months, losses in individual crops of 10 per cent at Nambucca, 20 per cent at Cudgen and 80 per cent at Duranbah being recorded. The disease also attacked tomatoes at several localities in the Sydney Metropolitan Area. Inspection of affected crops on the far north coast suggested that infection by ascospores is the chief source of infection with this disease.

ROOT KNOT (Meloidogyne spp.) was widely distributed in lighter soils. One grower at North Narrabeen (M.A.) submitted heavily infected seedlings produced on a plot he claimed had been treated for 15 minutes with steam generated at 100 lb/sq. in. pressure and applied by the unspiked pan system. Three varieties released for testing by the C.S.I.R.O. proved to be highly resistant to root knot but showed considerable variation in agronomic characteristics. One crop at Griffith (M.I.A.) was reported to have suffered a 50 per cent reduction in yield.

BLOSSOM END ROT (Non parasitic) was very widespread in the Sydney Metropolitan Area in November and continued through into January with a lower incidence in autumn. The adverse effect on high nitrogenous fertilizer was evidenced in a commercial crop at Duranbah (N.C.) where a portion of a crop which had been treated with nitrophoska exhibited

blossom end rot while the remainder of the crop was comparatively free of that condition.

LATE BLIGHT (Phytophthora infestans). Light infections with late blight were reported from Tahmoor (M.A.) in April and Duranbah (N.C.) in June. Some losses also occurred in a glasshouse at North Narrabeen (M.A.) immediately adjacent to an infected outdoor crop of potatoes in June.

DROP HEAD WILT (Virus) was again present in several glasshouses in the Warriewood-Mona Vale (M.A.) area although serious losses were reported from only one property. This disease also caused severe losses in glasshouses at Buronga (W.D.). This is the first record of the occurrence of drop head wilt outside the Warriewood-Mona Vale district and suggests that the disease may be more widespread than is known at present.

LEAF SHRIVEL (Strain of Potato Y virus). This disease is now known to be widespread and of economic importance on the far north coast of New South Wales.

STREAK (Virus). Single streak was present in several glasshouses at Warriewood-Mona Vale (M.A.) and in the Dareton (W.D.) area. It also occurred in the field at Orange (C.T.) and Liverpool (M.A.).

MOSAIC (Tobacco mosaic virus) was prevalent in glasshouses in the Sydney Metropolitan Area and also in the field at Fairfield, Leppington and Brookvale (M.A.), at Casino and Cudgera (N.C.) and Bilbul (M.I.A.).

LEAF SPOT (Septoria lycopersici) was widespread although no reports of serious defoliation were received.

LEAF MOULD (Cladosporium fulvum) as usual was a major disease of glasshouses and has now become an important disease of outdoor tomatoes on the far north coast.

HORMONE INJURY. Accidental contamination with weed killing hormones affected crops in several districts.

## MISCELLANEOUS PLANTS

BALLOON COTTON-BUSH (Asclepias physocarpa)

ROOT KNOT (Meloidogyne incognita) was recorded at Kyogle (N.C.)

BATHURST BURR (Xanthium spinosum)

ANTHRACNOSE (Colletotrichum xanthii) was observed to be affecting quite a large area at Edgeroi (N.W.P.) during a hot, wet period in April.

BLACKBERRY (Rubus fruticosus)

RUST (Phragmidium sp., uredospore stage) was observed at Beecroft (M.A.)

COBBLER'S PEGS (Bidens pilosa)

BROAD BEAN VASCULAR WILT (virus) was common in the metropolitan area, affecting up to 50% of plants in some areas.

INDIAN HEDGE-MUSTARD (Sisymbrium orientale)

LEAF and STEM SPOT (Alternaria brassicae) was recorded on this host for the first time in N.S.W. at Maraylya (M.)

PATERSON'S CURSE (Echium plantagineum)

FASCIATION. An extreme form of this deformity, 10 inches wide and 35 inches long, was observed affecting a plant at Parkes (C.W.S.)

SHEPHERD'S PURSE (Capsella bursa-pastoris)

WHITE RUST (Albugo cruciferarum) was severe in the Bathurst area (C.T.) and in many other localities.

TAH VINE (Boerhaevia diffusa)

VIRESCENCE (undetermined) was observed at Tamworth (N.W.S.).

THORNAPPLE, FIERCE (Datura ferox)

POWDERY MILDEW (Oidium sp.) was recorded at Murrurundi (N.W.S.).

## NEW PLANT DISEASES

During the twelve months ending 30th June, 1959, fifty one new plant diseases were recorded for the first time in New South Wales. These are listed here:-

Acacia pycnantha (Broad leaved wattle). - Diplodia phyllodiorum Penz. and Sacc. (Leaf spot); Cowra.

Agaricus campestris (Cultivated mushroom). - Myceliophthora lutea Cast. (Mat disease); Maraylya.

Allysum martimum (Sweel William). - Plasmodiophora brassicae Wor. (Clubroot); Newcastle.

Armoralia rusticana (Horse radish) - Meliodogyne javanica (Treub) Chitwood (Root knot); Gosford.

Beta vulgaris var. cicla (Silverbeet). - Heterodera schachtii Schmidt (Beet nematode); Botany. A survey conducted of market gardens in the Botany district indicates that this nematode is more widespread than previously thought.

Boerhaavia diffusa L. (Tah-vine). - Virescence (Undetermined); Tamworth.

Brassica napobrassica (Swedeturnip). - Alternaria brassicicola (Schw.) Wiltshire (Leaf spot); Tamworth. Heterodera schachtii Schmidt (Beet nematode); Botany.

Brassica oleracea var. capitata (Cabbage). - Heterodera schachtii Schmidt (Beet nematode); Botany.

Brassica oleracea var. gemmifera (Brussels sprouts). - Peronospora parasitica (Pers.) Fries (Downy mildew); Yetholme.

Brassica rapa (Turnip). - Alternaria brassicae (Schw.) Wiltshire. (Leaf spot); Tamworth.

Calendula officinalis (Calendula). - Oidium sp. (Powdery mildew); Sydney.

Chenopodium album (Fat hen). - Stagonospora chenopodii Peck (Leaf spot); Oberon.

Cineraria garden hybrid (Cineraria) - Oidium sp. (Powdery mildew); Botanic Gardens.

Citrus mitis (Calamondin) - Brown spot (undetermined); Narara.

Cleome speciosa (Cleome). Sclerotinia sclerotiorum (Stem rot); Pennant Hills.

Daucus carota (Carrot) - Meloidogyne incognita (Kofoid and White) Chitwood (Root knot). Metrop.

Daviesia latifolia. - Armillaria mellea (Vahl ex Fr.) Quel (Root rot); Yarrangobilly.

Dendrobium speciosum (Rocklily) - Guignardia citricarpa Kiely (Leaf spot); Lane Cove.

Galinsoga parviflora (Potato weed). - Sclerotinia sclerotiorum (Lib.) de Bary (Stem rot); Narara.

Gladiolus sp. (Gladiolus) - Meloidogyne sp. (Root knot); Richmond.

Gossypium hirsutum (Cotton). - Verticillium dahliae Kleb. (Wilt) and Xanthomonas malvacearum (E.F.S.) Dowson (Angular leaf spot, boll rot and blight); Narrabri.

Hebe hulkeana. - Peronospora sp. (Downy mildew); Mt. Wilson.

Hibiscus esculentus (Okra). - Rhizoctonia solani (Damping-off); Windsor.

Holmskioldia sanguinea.- Meloidogyne sp. (Root knot); Coffs Harbour.

Impatiens sp. (Japanese balsam). - Sclerotium rolfsii (Sacc). Curzi (Crown rot); Pennant Hills.

Lactuca sativa (Lettuce). - Salt toxicity; Panania.

/Lonicera sp. (Honeysuckle). - Cercospora lonicericola Yamamato (Leaf spot); Baulkham Hills.

Medicago arabica (Spotted medic). - Colletotrichum trifolii Bain & Essary (Anthracnose); Grafton.

Medicago glutinosa - Uromyces striatus Schroet (Rust); Grafton.

Microlaena stripoides (Weeping grass). - Anguina microlaenae (Fawcett) Filipjev (Leaf Gall); Baulkham Hills.

Monstera deliciosa (Monstera) - Guignardia citricarpa Kiely (Leaf spot); Pennant Hills.

Olea europea (Olive.) - Meloidogyne incognita (Kofoid and White) Chitwood var. acrita Chitwood (Root knot); Yoogali.

Osmanthus fragrans - Phyllosticta sp. (Leaf spot); Sans Souci.

Persea gratissima (Avocado) - Colletotrichum gloeosporioides Penz. (Ripe rot); Murwillumbah.

Phaseolus vulgaris (Bean). - Meloidogyne incognita (Kofoid & White) Chitwood (Root knot); Richmond.

Phleum pratense (Timothy grass). - Virescence (undetermined); Bathurst.

Prunus avium (Cherry). - Fasciation (undetermined); Bathurst.

Prunus domestica (Prune) - Fomes setulosus Lloyd (Wood rot); Young. Meloidogyne javanica (Treub.) Citwood (Root knot); Narara.

Rheum raponticum (Rhubarb) - Pnytophthora parasitica Dastur (Crown rot); Alstonville.

Sesamum indicum (Sesame). - Virescence (undetermined); Yanco.

Sisymbrium orientale (Wild mustard) - Alternaria brassicae (Berk) Sacc. (Leaf spot); Maraylya.

Sorghum almum (Columbus grass). - Helminthosporium turcicum Pass. (Leaf blight) Puccinia purpurea Cke. (Rust); Grafton.

Sorghum vulgare var. sudanense (Sudan grass) - Helminthosporium sativum Pass. (Leaf blight); Wee Waa.

Trifolium hybridum (Alsike clover). - Virescence (Undetermined); Bathurst.

Vigna sinensis (Cowpea). - Rhizoctonia solani (Crown rot); Taree.

Vitis vinifera (Grape). - Meloidogyne incognita (Kofoid & White) Chitwood (Root knot); Dalwood.

Zea mays (maize inbred line) - Helminthosporium carbonum Ullstrup (Black cob rot); Taree.